EDUCATION

A MONTHLY MAGAZINE

DEVOTED TO THE SCIENCE, ART, PHILOSOPHY AND LITERATURE OF EDUCATION

VOL. 68 FEBRUARY 1948 No. 6

WORKSHOPS IN SCIENCE EDUCATION

HANOR A. WEBB, *Editor*

Professor of Chemistry and Science Education
George Peabody College for Teachers, Nashville, Tennessee

Contents

		PAGE
Foreword	*Hanor A. Webb*	323
Science Education Workshops at Syracuse University	*Richard R. Armacost*	324
A Community Workshop in Science Education	*J. Darrell Banard*	328
Workshops in Elementary Science	*Glenn O. Blough*	332
The Science Teacher and Community Dynamics	*R. Will Burnett*	335
Science for Common Learnings	*Mildred Campbell, A. W. Gilbert, Meryle Shamberger*	341
Varied Purposes of Science Workshops	*Hubert J. Davis*	344
Putting Workshop Ideas To Work	*Donald G. Decker*	348
Florida's *Guide to the Teaching of Science in Secondary Schools*	*Edward B. Henderson*	352
The Science Workshop: University of Maine	*Robert N. King*	356
The Workshop as an Agency for Professional Education of Science Teachers	*S. Ralph Powers, Anita D. Laton*	359
General Electric Science Fellowships for High School Teachers	*Harold N. Rowe*	363
A Workshop is Democracy in Action	*Frank S. Stafford*	366
Missouri Shows How: The Springfield Workshop	*Herbert S. Zim*	373
School Time on the Air	*A. L. Laufe*	377
Editorial—"I Only Work Here"	*Carl G. Miller*	380
For Your Bookshelf		381

Published Monthly Except July and August
Subscription Price: $4.00 per year, 50 cts. per copy
Entered as Second Class matter at the Post Office, Boston, Mass., under the Act of March 3, 1879

THE PALMER COMPANY, Publishers

370 Atlantic Avenue Boston 10, Massachusetts

Betts Basic Readers

The Language Arts Series

EMMETT A. BETTS
Professor of Psychology
Director of the Reading Clinic
Temple University, Philadelphia

CAROLYN M. WELCH
Formerly Acting Supervisor
The Reading Clinic, Dept. of Education, Baltimore

Introducing three lovable characters who are going to mean a great deal in the lives of your children: Wendy, a charming little girl; Kim, an active little boy; and Tike, a mischievous little dog.

American Book Company

EDUCATION

Vol. 68 FEBRUARY 1948 No. 6

FOREWORD

WHATEVER shortcomings this special Science Workshop issue of EDUCATION may have, it does not lack (a) first-hand information from experience, and (b) variety. Probably no two educational workshops are alike—perhaps they should not be. Yet there are workshop techniques in general, and science workshop techniques in particular.

The clearest suggestions of *general plans* for workshops in education that we have seen are in a little bulletin, *The Workshop,* by Paul B. Diederich and William Van Til (32 pp., 1945, Hinds, Hayden & Eldridge, 105 Fifth Ave., New York City). But we know of no collection of *specific plans for science workshops* that precedes this issue of EDUCATION, presenting reports of those who have planned and directed them. Let the reader consider the practicality of these plans in his own educational climate.

Two questions usually arise concerning educational workshops. The first: *Why are workshops so rarely scheduled in the fall, winter, and spring months, but are typical of summer offerings?* The answer is easy—these workshops are for experienced and active teachers, not learners, and these teachers as a rule are limited to the summers for their self-improvement.

The second question: *If workshops have such values to teachers, why are they not more widely offered?* This answer is also easy for all who observe the reluctance with which vested interests in college departments and courses will yield to the requests of teachers in active service. Educational needs and opportunities in our communities are constantly changing; educational instruction often holds fast to the traditional. Only a few teacher-training institutions in our nation are really *leaders* of educational thought; many are not even good *followers* of the advancing programs of educational service.

Are workshops an *easier way* to make better science teachers? Are they a more *effective way?* A more *economical way?* More *inspiring?* More *satisfying?* Read these articles, and judge. But do not overlook a point of view hidden in each story that has been best expressed by that favorite philosopher of science teachers—Thomas A. Edison: "Success is one per cent inspiration, and ninety-nine per cent perspiration!" There's *work* for everybody in a workshop!

— HANOR A. WEBB

Do science curricula need overhauling? Then gather earnest teachers in a workshop, and their experience will guide them.

Science Education Workshops *at* Syracuse University

By RICHARD R. ARMACOST

Dual Professor of Science and Education, Syracuse University, Syracuse, New York

A SUMMER workshop has been described as "a summer school with no courses, no textbooks, and no examinations."[1] Science education workshops held at Syracuse University during the past two summers did not meet that description, since only certain carefully selected practices of the general curriculum workshop idea were employed. Concentration was centered around the specific curriculum problems of science teachers individually, and the major issues of the science teaching profession, rather than a study of the larger school problems which should be the concern of all teachers regardless of subject matter area. This type of workshop should not be confused with the general curriculum workshops previously held at the University.

Other Subject Matter

In addition to the Science Education Workshop, other subject matter groups participated in workshops during the six-week summer session. These workshops were in the areas of business education, English education, home economics education, social studies education, and visual education. An administrator in charge of general planning for all workshops was appointed and an effort was made to coordinate, wherever possible, related activities. Several meetings of all workshop directors were held well in advance of the summer session. These involved preliminary planning on philosophy and procedure, housing, budget, social plans, the availability and best uses of resources including consultants, and other matters of general interest.

Workshop Calendar

During the summer session, a general workshop calendar was issued weekly. This listed major events to be held in the different workshops, and indicated the time and place off-campus consultants would be available. The result was a more general use of consultants and frequent inter-workshop visits by students. A committee composed of representatives of each workshop section was formed and held a series of meetings devoted to the study of selected general curriculum problems. Reports of progress and conclusions reached were periodically made to each workshop by their representative. Social functions including

1 Paul B. Diederich and William Van Til, *The Workshop*. (New York: Hinds, Hayden, and Eldredge, Inc., 1945).

a get-acquainted party, a picnic, and a farewell party were cooperatively planned by students and faculty for members of all workshops.

General Plan of the Science Education Workshop

The Workshop in Science Education was planned primarily for experienced teachers who wished to work on specific curriculum problems which existed in their schools, and desired to study and discuss, as a group, selected problems in science education. The curriculum problems of the individual members were brought by them to the summer session and carefully defined early in the workshop program. Such problems included: a revision of objective tests used in ninth grade science in the Syracuse schools; selection of activities for the General Science program at Minoa; an outline for seventh, eighth, and ninth grade General Science at Herkimer; a Biology Laboratory program for Canastota High School; a laboratory outline for ninth grade Science at Skaneateles; a laboratory plan in Physics for New York Mills; a plan for Science Club work and a Science Fair at Grant Junior High School; plans for supervised study in the General Science program at Ballston Spa; ways of taking care of individual differences in the Science program of North Syracuse; a laboratory outline for the General Science program at Tully; and others. Small groups within the Workshop were organized around related problems wherever these existed.

All members of the Science Education Workshop had a part in selecting topics to be discussed at the daily general workshop meetings. Priority was determined by the amount of interest expressed by the participants. Areas suggested for study and discussion included: evaluation in science at different grade levels; some uses of visual aids by science teachers; a good lesson I have taught; the science teacher and the community; Science Clubs and Science Congresses; the curriculum of New York State, its merits and defects; some means of taking care of individual differences; legal responsibilities of science teachers; professional responsibilities of science teachers; the relationship of the science teacher to the total school program; and others.

Off-Campus Consultants

Special consultants from off campus helped on specific curriculum problems and as leaders in general group meetings. Because it was impossible to get many of the competent off-campus consultants in the field on short notice, they were selected, for the most part, by the Workshop Director before the students enroled. Off-campus consultants consisted of: a curriculum expert from the State Department of Education; a curriculum expert from a State Teachers College; a nature study authority; a specialist in science from the United States Office of Education; an elementary school principal; a highschool principal; an industrial bacteriologist; and last, and far from least, classroom science teachers.

Additional consultants chosen from the summer school faculty were available as problems or discussions involving their fields developed. Participating members of the University staff were the museum preparator; a botanist proficient in the use of visual aids;

the director of the film library; a professor of natural history; the head of the University Evaluation Service Center; the head of the Reading Clinic; and the Dean of the School of Education.

A high point of the Science Education Workshop was the participation of its members in the annual two-day summer conference of the New York State Science Teachers Association. This meeting was co-sponsored by Syracuse University, and provided opportunity for science teachers on the campus to meet with teachers from all parts of the state.

Daily Schedule

Regular 90-minute sessions of the Workshop were scheduled daily, Monday through Friday, at 8:00 a.m. This early hour permitted members to have the remainder of the day for individual consultations, library work, and the use of other available resources. An informal coffee hour in a corner of the University cafeteria usually followed these meetings. This provided an excellent means of continuing discussions and getting better acquainted. Students registered for either three or six semester hours of workshop credit depending primarily on the nature of the individual curriculum problem presented.

The Workshop room was not the usual type of classroom. The office of the Director was in one corner. The room was headquarters for any of the visiting off-campus consultants. Many books, courses of study, records of previously studied curriculum problems, periodicals, mimeographed briefs and summaries, as well as other useful materials were housed in this room and available throughout the day. It was, in brief, a place where Workshop members could work unhampered by library restrictions, and could meet together for discussion of their mutual problems.

The First Week

The general meetings of the first week had been planned beforehand by the Workshop Director. Members began reporting to the class the first five minutes of the first session when they described their school situations, and gave as best they could at the time, their primary reasons for enrolment in the Workshop. The Director described his experiences with previous science education workshops, and indicated weaknesses as well as strengths of these programs.

A great deal of emphasis was given to the importance of starting immediately on the study of individual curriculum problems. The Director scheduled conferences with each student and helped him define and limit his curriculum problem. A student chairman was selected by the group and instructed to collect and summarize their ideas for discussion topics at future general meetings. The Director acted as leader in several sessions devoted to a description and analysis of the New York State science curriculum. Since the students were familiar with this program, they soon were debating its merits and deficiencies freely. At the end of the week an outline was passed out which indicated the name of each Workshop member, his past teaching experience, his position for the coming year, a statement of his individual curriculum problem, and the dates on which to expect off-campus consultants.

After the First Week

After the first week, general meetings were cooperatively planned by the student chairman and Workshop Director. The suggestions gathered from Workshop members were the basis of the weekly plans. This outline was used only as a guide and in no instance represented a rigid schedule to be followed. Periodically general meetings were devoted to reports of progress on individual curriculum problems. Workshop members made many helpful suggestions to those reporting. Individual conferences with the Workshop Director, off-campus consultants, and regular University staff members continued throughout the program. Sessions during the final week provided an opportunity for each teacher to present a summary of achievement on his curriculum problem. A typed copy of his work was left in the Workshop room so that other class members could see the details of his study.

Science education workshops are expensive, but individualized instruction is always expensive. Past experience indicates that the kind of workshop previously described should be restricted to no more than twenty-five participants. As workshops increase in students numbers, more and more major objectives of the techniques used are either lost entirely or become less effective. Prospective workshop directors need to convince their administrations that this type of education is a badly needed teacher service which will pay dividends in ways other than immediate financial return. Workshops in science education are planned for future summer sessions at Syracuse University.

THE JEAN BENNETT TEACHERS' BUREAU
3 CONWAY STREET **ROSLINDALE, (31) MASS.**
Pa. 7-7634 JEAN BENNETT, Director
"A Personalized Service for Administrators and Teachers"

Will a science workshop succeed in a community instead of on a campus? This experiment was most interesting.

A Community Workshop *in* Science Education

By J. DARRELL BARNARD
Professor of Education, New York University, New York, New York

DURING the summer of 1941, a Workshop in Science Education was conducted in Hastings, Michigan, under the direction of the University of Chicago. This Workshop was one of four operated that summer within the seven county area of the Michigan Community Health Project.[1] In many respects these workshops were unlike other workshops in teacher-education. This article will deal primarily with the unusual features of the Community Workshop in Science Education.

Practical Purpose

As was true of the other three workshops, the Workshop in Science Education was developed as a means of meeting requests from teachers in the seven-county area for assistance with special kinds of professional problems. Many had asked for aid in developing science programs for their schools. Since most of these teachers were in Barry County, Michigan, the Barry County Teacher Education Committee set about to develop a summer program that would meet this need.

A number of different summer programs were considered as possibilities. Among them were special courses at some college and on-campus workshops. Many of the teachers had previously participated in workshops on college campuses. They had obtained various kinds of help from participation in those workshops, but the committee now wanted a program even more practical than an on-campus workshop. It was finally decided that an attempt would be made to bring a workshop directly to the Barry County community. Experiences in such a program, it was thought, would be more meaningful to teachers. The committee's request to the University of Chicago for a Community Workshop in Science Education was granted early in 1941.

The writer had been serving certain high schools in the area as a consultant in secondary education. Since most of his professional preparation had been in science education, he was designated by the University to direct the Workshop and to assist the teachers in making preliminary plans for the program.

Pre-planning by Director

Preparation for the Workshop involved four general types of activity on the part of the Director. He worked closely with the Barry County Teacher Education Committee on the following problems: (1) In what community should the workshop be located? (2) How should the workshop be organized? (3) What kind of preparation should applicants receive for participation in the workshop? (4)

1 Henry J. Otto, *et al., Community Workshops for Teachers in the Michigan Community Health Project.* (Ann Arbor: University of Michigan Press, 1942).

What kind of personnel should be obtained to staff the workshop? (5) How should people in the community be prepared for the workshop?

Personal Contact

The Director visited each of the eighty applicants for the Workshop in his or her school before the end of the school term. During these visits an attempt was made to discover the applicant's reasons for wanting to attend the Workshop and to help the applicant understand what kind of benefits he might receive from participation in the Workshop. After Hastings had been selected as the location, he also visited the officials of community agencies that might be affected or might become directly involved in the activities of the Workshop. He explained the purposes of the Workshop and ways in which its resources might be used by community agencies. After the Workshop staff had been selected every effort was made to acquaint them with the type of community in which the Workshop would be conducted and the kind of teachers with whom they would be working.

The preliminary activities described above were in a large measure responsible for whatever success the Workshop achieved. The workshop idea had originally come from the teachers. Representatives of the teachers had helped plan the program, select the staff, and prepare the community for it. By the time the Workshop officially opened, most of the teacher participants had become closely identified with it and felt responsible for its success. It was their program and not a tailored-made one handed down to them by the University. The eagerness with which the people in the Hastings community cooperated with the staff and participants during the summer was to a large extent a result of the preliminary work that was done in acquainting the community with the program. Because of the way in which the staff had been introduced to the community and to the teachers, there was greater unity of purpose in getting the Workshop activities organized and operating.

Seventy-two teachers were admitted to the Workshop, all of whom received tuition scholarships from the W. K. Kellogg Foundation. Among the seventy-two teachers there were sixty-three women and nine men. Only twelve were highschool teachers. There were twenty-three village elementary school teachers, thirty-six rural elementary school teachers and one county school commissioner. Only twenty-nine of the teachers had completed the Bachelor's degree.

Specific Purposes

The following is a list of the problems or purposes related to science education which these teachers brought to the Workshop. The number of teachers who listed each purpose is indicated: to develop background in science—22; to organize a science course for a rural school—15; to organize a science program for the early elementary grades—15; to work out methods of using local environment in teaching science—14; to develop usable science demonstrations for the elementary grades—3; to make science of more practical value to all highschool students—3; to develop a topical file of source material in science—2; to select a general science textbook—1; to develop supplementary laboratory activities in high school physics—1.

In addition to the above purposes, some of the applicants had indicated that they wanted help in organizing their school libraries. This need had

grown out of a project sponsored by the W. K. Kellogg Foundation through which many new library books had been made available to the schools. A few applicants had also listed problems in community study and parent-school relations.

Most of the teachers desired course credit for their work and arrangements were made with various departments at the University to grant credit in four different fields. There were two courses in science, four in education, two in sociology, and three in library science in which participants might receive credit depending upon the kinds of problems they pursued in the Workshop. Most of the participants took course credit in science and in education.

Staff Members

The staff consisted of eleven full-time members. One full-time staff member and four part-time people were obtained to work with the twenty-two teacher-participants, who wanted to develop their backgrounds in science. These men were specialists in various branches of biological science. The staff also included a specialist in elementary science, and another in secondary science. These people helped teacher-participants develop learning activities in science appropriate for their respective grade levels.

Another staff member was a specialist in guidance and assisted teachers in evaluating their materials in terms of needs and interests of children. There were also a sociologist and a specialist in library science on the staff. They worked with small groups who were interested in problems dealing with community studies and school libraries. Five members of the staff had been selected to operate a laboratory school as a part of the Workshop. In planning the Workshop the teachers had insisted upon a laboratory school. As one teacher put it, "I want to see expert teachers work with our children in our community." It later developed that the laboratory school proved to be the most effective feature of the Workshop in coordinating Workshop activities with the community.

Workshop Locale

The main sessions of the Workshop were held in a modern, well-equipped elementary school in Hastings. The lower elementary, intermediate elementary, junior high school, and senior high school sections of the laboratory school were also housed in this building. The rural-elementary section of the laboratory school was conducted in a one-room school three miles from Hastings. The Workshop schedule extended from eight o'clock in the morning until half-past three in the afternoon from Monday through Friday. Special interest groups met during the first two-hour period in the morning. The second two-hour period in the morning was reserved for observation in the laboratory school. At noon a 90-minute period was scheduled for the group to have lunch together and engage in recreational activities. Another two-hour period was reserved in the afternoon for special interest group meetings.

The staff worked with teacher-participants in several different ways. Each staff member had a number of participants assigned to him for individual advisement on the problems which they had brought to the Workshop. Insofar as possible the nature of the participant's problem was used as a basis for assigning him to a staff member for advisement purposes.

Since the staff member in charge of the biological science program believed that a certain body of subject matter should be given to those taking credit in science, he presented regularly scheduled lectures to the group as a part of their work.

In addition, the specialists in biology spent a good deal of time with students in the field. The principles of biology were demonstrated in the woods, the streams, and the lakes of Barry County. Here teachers learned how to use this environment in teaching children. The staff members in elementary science, secondary science, and guidance worked with practically everyone of the participants sometime during the summer. They visited the school-community in which the participant taught and worked out ways in which he could use the local community resources in his science teaching. Whenever a teacher's problem could be solved more effectively by spending time in the actual school situation where the problem existed, this was done.

Laboratory School

Two principles were observed in the conduct of the laboratory school: (1) the program was developed from the interests of boys and girls enroled in each section, and (2) activities in science were encouraged since the teacher-participants were primarily interested in science education. Although none of the teacher participants was required to observe activities in the laboratory school, each teacher observed an average of 14.8 days out of the 25 days that the laboratory school operated.

It was through the laboratory school that the Workshop achieved its most effective working relationship with the community. The laboratory-school children under the supervision of their teachers undertook the task of renovating an old park in Hastings so that it could be used for recreational purposes. Although this project was initiated by one of the laboratory-school sections, every youngster in the school participated in the project. Community recreational agencies, the School Board, the Town Council, the Street Department, the County Sanitary Engineer, the County Agricultural Agent and a local specialist in landscaping became involved in the project before it was completed.

Project Achievements

Many purposes were achieved through this one project. A recreational area for the community was provided. The children who would use the recreational area had assumed the responsibility for getting the job done. Both the teacher-participants and the community observed a demonstration of the way in which the school could become a vital part of community life.

In conclusion, this Community Workshop in Science Education had several significant characteristics. It was initiated and planned by the teachers who were to be served by it. The Workshop was operated in a school-community that was familiar to all participants. It provided opportunity for teachers to improve their backgrounds in science through the development of a better understanding of their natural environment. It helped them apply their knowledge in the preparation of learning experiences for children. Children from the first grade through high school were a part of the program. In a period of six weeks it became a real and vital part of the community.

Will your grade teachers welcome aid in science? Workshops may give them help, and self-confidence.

Workshops *in* Elementary Science

By GLENN O. BLOUGH
Specialist for Science, Division of Elementary Education,
U. S. Office of Education,
Washington, D. C.

HOW can our teachers in the elementary school learn to teach science better than they now do? Superintendents, supervisors, principals and others concerned with the progress of science teaching in the elementary grades continue to ask this question. Teachers have been talked at and written to—they hear lectures, they are given bulletins and courses of study, textbooks and reference lists. All of these emphasize among other things, that *we learn by doing.* They also emphasize that children learn better those things that interest them and make a real difference to them. On the supposition that these are as true for adults as for children, the idea of workshops has been drummed up.

Points of Departure

In some respects workshop experiences for elementary teachers differ from workshops for science teachers at the secondary level. Generally speaking elementary teachers have had less training in science than have high school teachers, consequently they need more subject matter background and greater opportunity to handle experimental apparatus for themselves. By all means they must see how science fits into the general elementary school program. As will be seen later, these matters will be taken care of if the workshop is planned according to the philosophy which should underlie it.

The Workshop Idea

How is a workshop different from a class, a series of lectures, an institute, or some of our other educative devices? Let's not quibble over definitions. All kinds of gatherings have come to be known by the title of "workshop." But for purposes of this discussion let us say that a workshop in elementary science stands for the same procedures that good science teaching itself should stand for. Among these are: (1) Opportunity for the learner to plan what he shall spend his time doing so that it will be meaningful to him, something that really makes a difference because it is a real problem to him, his own problem or the problem of the group of which he is a part. (2) Active participation on the part of the learner. Not just listening without participating by thought or action. He makes plans to solve problems of real concern and then goes ahead and *does* something about it. He learns by doing. (3) Problem solving through actual experiencing the ways of finding out; delimiting the problem, exploring possibilities, determining a course of action then following it to a conclu-

sion that will later be verified. The learner experiments, reads, observes, works with consultants and through many other ways comes to a satisfactory solution of his problem. In a nutshell and without benefit of unnecessary pedagogical terminology, that is our concept of a workshop.

In the Beginning

A good workshop needs to get off to a good start. The pre-planning done by the staff and the planning for the work by staff and students must be thoughtful and thorough. It must be charged with sincerity on the part of all concerned. "Made up" problems are not workshop problems.

Before the workshop convenes the staff should learn as much as possible about the needs, abilities, background, and work habits of those who will attend. Staff members should be as familiar as possible with the resources (libraries, films, experimental apparatus, demonstration classes, laboratories, etc.) that will be at hand to use. This does not preclude planning together when students arrive! On the other hand it facilitates it. Insofar as possible, students who will attend should be informed regarding the general method of procedure in the workshop so that they may bring materials with them as well as give some thought to statements of the problems on which they will work.

Initial planning periods by staff and students should exemplify a good learning situation. There should be democratic planning for all phases of the working and living together. As the planning proceeds, statement of problems to be considered will evolve. Groups with similar interests will be organized, each will devise its own plan of procedure. It is this planning that is extremely important. Although the plans will, in all probability, be altered as work proceeds, careful thought at the beginning is essential to successful progress.

Some Typical Problems

Following are some of the types of problems that have been studied by groups of teachers interested in science in the elementary school.

1. What should a study of science do for the girls and boys in the elementary school?
2. How can children in the elementary school best learn about their environment?
3. What community resources are available for use in grade-school science?
4. How can elementary teachers improve their science background?
5. How can time for science be provided in an already crowded elementary school program?
6. What relationship should science have to the other areas of study in the elementary school?
7. How can we evaluate the results of our science teaching?
8. What materials are needed for teaching grade-school science and how may these materials be obtained?
9. How can an elementary science course be built around children's needs?

Ways of Working

Participants themselves should plan their procedures. They begin by analyzing their problems, exploring the possible ways of solving them, selecting what appears to be the best method, and proceeding accordingly. It is this procedure which we hope teachers will come to use more and

more with their pupils. Having had the experience of participating in it themselves, they should be better equipped to guide pupils in its use.

In solving their problems participants find and use available reading material, enlist the advice of consultants, make field trips, perform experiments, look at motion pictures, and engage in other similar activities. They grow in their ability to plan, to evaluate, to organize, and to guide. They come to realize the importance of these things as well as come to know how much more effective learning is, if it is concerned with real problems, when there is purposeful activity and careful planning.

Organizing and Evaluating

An important part of a workshop experience is that of organizing the findings and making from them a plan of action appropriate to the original problem. The questions then are: What have we found out? How can we make use of the findings? The answering of these questions constitutes the "examination." There is a closing period devoted to compiling findings and sharing them with the total group either orally or through written reports.

Practical Adaptation

Since the original problems were real, the participants are now equipped to place the results of their work into practice in their classrooms. Their science teaching will improve if they are able to use their problem-solving experience with children in their classrooms. If they believe in this experience, their science teaching will also be built around problems of real concern to their pupils, there will be more learning by doing, more planning by pupils, and more emphasis on pupil-teacher evaluation. No science teacher, I believe, will question these as worthy directions in which we should move in our science teaching. Workshops have the potentialities for making real contributions toward accomplishing these aims provided they are conducted in the spirit in which they were originally conceived.

Should science teachers seek direct experience in their communities? Here is a workshop way.

The Science Teacher *and* Community Dynamics

By R. WILL BURNETT

Professor of Science Education, University of Illinois,[1]
Urbana, Illinois

FOUR major assumptions underlay the objectives and procedures of the Community Resources Workshop conducted under the auspices of San Francisco State College during the summer of 1946. First, that the science teacher along with those representing other areas of special competence properly derives his professional goals from three sources: societal needs, personal needs, and democratic values. Second, that the science trained teacher, with others, suffers in his efforts to discharge his responsibilities within these goals from a paucity of direct experience with community dynamics and social forces. Third, that teachers too seldom recognize the impact and integral part of science in modern community life. Fourth, that the science trained teacher, along with teachers of other fields, too seldom has experienced the values of working in a professional team in frontal analysis of problems expressed in community life, and in structuring these problems in order to make an educational contribution in terms of his particular professional strength.

The objectives of the Workshop grew directly from these assumptions. They were to provide for each student the guidance, contacts, and facilities to (1) increase his appreciation of the dynamic nature of community life; (2) provide him increased intellectual and emotional rottage in the lives of people and their problems; (3) give him increased recognition of, and desire and abilities to support, the social forces operating better to meet societal and personal needs, and to advance democratic goals and values; (4) give him increased awareness of the social forces tending to operate against democratic goals and values and to deepen societal and personal needs; (5) increase his power of intellectual attack on significant living problems—first as an individual citizen, and second, as a leader of youth: more particularly to aid him in achieving a more personally satisfying and democratically positive social and philosophical orientation as a person and citizen, and to aid him in wedding this growing insight to increased understanding of his responsibility to

1 At the time the Workshop was conducted the author was Professor of Biological Sciences and Science Education, and Head of the Division of Natural Sciences, San Francisco (Calif.) State College.

the youth and communities he serves as a teacher; (6) increase his abilities to work as a member of a professional team in community study and in utilizing community resources for more effective guidance of youth.

Pre-planning the Workshop

It was determined to (1) invite as participants in the Workshop teachers representing all subject matter backgrounds and levels of school work so that effective team participation might result; (2) select representative areas for work in which significant discrepencies exist between actuality and the potentiality that our technical prowess and democratic values promise; (3) study these areas primarily through field contacts with the problems, organizations, and other social forces impinging on them.

The Workshop staff was composed of Dr. Carlo Lastrucci, a professor of sociology with particular competence in urban sociology; Miss Helen Ettlinger Jones, an advanced student at the College who had a rich background of experience working in various field service capacities with student groups in urban sociology both in Europe and America; Melvin Farley, at that time a graduate student in science education at Stanford University; and the author. Mr. Farley accepted the responsibility of evaluating the procedures and outcomes of the Workshop, including a one-year follow-up study of the participants to determine residue outcomes.

This group began its planning in January of the year preceding the summer workshop. The areas selected for study during the Workshop were production and distribution, including emphasis on management and labor points of view and activities; intercultural relations; health; housing; crime and its prevention; transportation and traffic problems, local and regional; and the agricultural rootage of the community with a particular emphasis on farm management to conserve the soil. Community and regional planning was a major and over-all focus as it affected, and was affected by, the areas considered and illustrated in the complexity of community dynamics.

It will be recognized that although the list is not exhaustive of significant areas, it was too extensive for intensive work to be done on each problem. The decision to include so extensive a listing was based on the belief that such exploratory analyses as could be provided would, at least, permit the development of an intellectual and emotional rootage, and possibly provide a stimulus to teachers to carry on more intensive work independently following the end of the summer experiences. It was also thought that only through such varied contacts might the participants gain understanding of the inextricable relationships of such problems with each other in modern society.

Advanced Scheduling

It was clear that the complexities of such a proposed field offering necessitated advance scheduling of contacts with organizations, experts, associations, and problem settings, plus a good deal of precision timing. Thus was lost one of the values to participants that might have accrued had a less amibitious coverage been attempted—that of participation by the students in all stages of planning and operation. The techniques that the

staff had followed, including display of correspondence and description of preliminary contacts and visits, were provided, however, to the group during the course of the Workshop.

Space does not permit an adequate description of the pre-planning. It included the discovery of groups affecting each of the areas of proposed study, the solicitation of their cooperation, initial and follow-up conferences with these groups, arrangement and scheduling of field trips and meetings, and the selection of reference and audio-visual materials for each of the areas.

The Workshop

A detailed report on the Workshop procedures and an evaluation of them will soon be available in a doctoral disseration by Melvin Farley. The following description will attempt merely to give an overview of procedure.

The work was begun by asking each participant to complete a questionnaire regarding the San Francisco metropolitan area and his own teaching community where that was a different community. This instrument asked the student to indicate what he knew of each of the areas in terms of the following: status of the problem and dominant trends; social forces and organizations tending to better the problem; social forces and organizations tending to worsen the problem; what he, as an educator, believed he could and should do regarding the problem; blockages that he, as an educator, recognized standing in his way; what he believed he could do to remove the blockages or lessen their effectiveness. At the end of the summer's work a comparable instrument was given to each student as one measure of change.

One half of each day, Monday through Friday, was reserved for the Workshop activities. It was the wrong half of the day—the morning. The problem of a number of students in returning to the campus for an early afternoon class became chronic. So did the habit of missing lunch. Trips were scheduled for many Saturdays. Although these were optional and were full-day trips lasting, quite often, until late evening, all participants, to my memory, went on all trips.

The first trip was by air over the San Francisco Bay Area and surrounding countryside. Two twin engined DC-4's were chartered at the nominal cost of $4.00 per student for a trip lasting about three quarters of an hour in the air. Preliminary discussion outlined the purposes of this trip. The Bay Area of the metropolitan area did not, of course, just happen. Physiographic and meteorological factors underlie its present greatness and create many of its difficult problems. The air trip was to secure a more adequate picture of this setting.

City Planning Commission

The second trip was to the offices and chart rooms of the City Planning Commission. A full morning was spent with the Commissioner and his staff. Their analysis of the unplanned growth of the city and region and its present problems was ably and dramatically supported by the typographical maps, the many charts illustrating the results of their rich and varied studies, and the Master Plan studies which, together with the charts, were placed on

loan for the group at the College for the duration of the summer's work.

Following the trip to the City Planning Commission the group spent a morning in preliminary analysis of the data now in their hands, and in exploring procedures and contacts to be followed during the course of the summer. The group agreed that critical notes would be desirable on each field contact and on all pertinent readings. It agreed further, that for each of the major areas, each participant would be responsible for an informed and critical statement involving each of the points raised in the original questionnaire. These were developed during the course of investigation of the problem and completed within a week following the last of the field contacts on that particular problem.

Deeper Analyses

Using the basic data provided by the City Planning Commission the group drove deeper into analyses of specific problems. Housing was attacked first. Trips included a day in the Fillmore section of San Francisco —a deeply blighted area. The group talked to the residents of several buildings and inspected one ancient and delapidated building which, with four tired bathrooms, attempted to provide shelter and a basis for living and democratic values to over 200 persons. Also included were inspection trips to one possible partial answer to the housing problem—that of private enterprise in the form of the Metropolitan Life Insurance Company's Park-Merced housing development (rentals admitting chiefly upper middle economic groups); and to another possible partial answer—that of the U. S. Housing Authority in the form of the low-rental housing provided in certain regions of the city.

It must be understood that these contacts did not consist of mere "field tripping." The group was looking at housing in terms of people, their lives, and shaping ideologies, health, and happiness. The complexities of the problems discussed cannot be presented in the limited space provided. But the central question was: Are these the best answers America can provide to the housing problem?

Inadequate Answers

Study on this problem as well as others disclosed that we have the resources, power, technological "know-how," and manpower for far more adequate answers than those presently evidenced. The science teacher began to question what he had been teaching! Blockages and deterrant social forces became more clear as investigation proceeded. The science teacher began to consider how he could work in his community in terms of such forces! Possible paths through social engineering of a democratic rather than an imposed type were explored. The science teacher began to consider whether his responsibility to young people and the community he served stopped with the reporting of technical possibilities or whether he, with his colleagues, should and could go further in analyzing social procedures whereby scientific potentiality could become democratic actuality! Feelings of responsibility of educators in a democracy were beginning to find strong rootage, and possible procedures to discharge this responsibility began to form in sufficient focus that the science teacher—and his colleague parti-

cipants in other fields—began looking at his task in rather new ways.

Other areas were attacked. Over thirty trips were provided by the highly cooperative State and City Departments of Health. Some members of the group followed the visiting nurses on their duties. Others visited hospitals, laboratories, crippled children clinics, well baby clinics, venereal disease clinics, etc. Analysis included the fact that health, in a very real sense, is a purchasable commodity. Data from many studies disclosed that some must still live as if the advances of medical science over the past fifty years had never been made.

Possible Solutions

Various proposals to solve the problem of the costs of medical care and the inequitable distribution of such care were explored—from the British plan including the recently circulated "white paper," to the Wagner-Murray-Dingall bill and that of the Governor of California as presented to the last session of the state legislature. A trip through the Permanente Foundation Hospital demonstrated one anwser in providing a basis for the practice of modern medicine through pre-payment of standard fees. The inspection trip of facilities was followed by an informative discussion with the director of the Foundation's health plan and with the director of medical research at the hospital.

A full day was spent on farms and soil conservation districts near the city under the direction of a corps of conservationists. How they operated, what results they could demonstrate, what was happening locally and nationally to the Nation's first resource was explored carefully. The judgments of farmers who were cooperating in district plans were secured.

And so it went. Discussions with the judge of the juvenile court; trips through a labor hiring hall and to the waterfront to observe stevedores at work; discussion with labor leaders; a trip through one of the largest factories followed by a discussion with the management staff on policy, trends, headaches, labor policy, where the consumer came in—comparable questions to those put to labor representatives. Talks with representatives of racial, national, religious, and ethnic groups —and with individual members of such groups who, perhaps, gave us the best, though unknowing, representation of the problems their groups were facing. Dinners together at French, German, Italian, Chinese, and other "foreign" restaurants. Bull sessions following an evening at "The Drunkard" and at the legitimate theater. Post-mortems on our trips. Heated discussions from many of which came light.

And finally, back again, after this concentrated searching of various areas of significance, to the offices of the City Planning Commission to attempt to bring the many strands together. To look again, as we had started in doing, at the total fabric of metropolitan San Francisco — its hopes, evidences of failures and inadequacies, and its plans for intelligent democratic advance.

Evaluation

The results? Enthusiasm and unanimous request for continuation of this type of workshop. These were unmistakable. Definite evidence of increased understanding on all explored phases of the problems as represented

by the objective data of the participants' papers and final questionnaire response. Judgments expressed anonymously by the group that such a workshop covering many aspects of city life was preferable, as a first experience, to a workshop concentrating in one area such as health. Belief that such experiences should be made a required part of the teacher training program of all elementary and secondary school teachers and offered during the academic year. Evidence of the complete cooperation and interest of all organizations and groups contacted in continuing and expanding this type of service in educating teacher groups.

Judgments, anonymously and unanimously expressed, that [we are paraphrasing the response] "For the first time I will study this newspaper report, this article, this book, and know what it means in terms of real events, real conflicts, real people."

The long range results in terms of changed teaching are not yet known. Preliminary results are reported by Mr. Farley to indicate that teaching has been changed. The group felt that too little time had been made available for study of books, monographs, and other types of references, and that they had hardly started on their analysis of the problems. This reaction was inevitable and was anticipated. Whether the Workshop did the prime job it attempted—that of providing sufficient intellectual and emotional rootage in real problems seen in their complex settings to enable individual participants successfully to continue their analyses in the following years—is unknown. Certainly we, as a group, *answered* few questions. It is to be hoped, however, that these teachers will feel as did a student from a similar workshop in which the author participated. This student wrote from his teaching job some months later: "I'll never teach quite the same way again. I can't quit thinking, just what has my science to do with people like those we talked with and with the lives they were living."

Such a concern must be the basis for science teaching and for all teaching in American democracy. Workshops, such as the one described, may help develop the concern.

Are you interested in a science curriculum for seventh and eighth grades, well correlated with language arts and social science? Plans for three large topics emerge from a workshop.

Science *for* Common Learnings

By MILDRED CAMPBELL, *Southeast High School,*
A. W. GILBERT, *Director of Research and Curriculum,*
and MERYLE SHAMBERGER, *West Junior High School,*
Kansas City, Missouri

TWO factors led rather directly to the planning of a 1947 summer workshop stressing science for teachers in Kansas City (Mo.) to be sponsored jointly by the Board of Education and the University of Kansas City. First was a new emphasis on teaching science throughout the elementary school which came with the preparation in 1944 of a teachers' guide in this subject. Second was the inclusion of science as an integral part of a Common Learnings or General Education program in a newly-established eighth grade.

Under the influence of these factors many teachers were saying: "I'm not prepared to teach science." "Where can I get some help?" "Can science be integrated with social studies and language arts?" "How can the ideas and principles of science be taught without laboratory equipment?"

Sketchy Science Backgrounds

Considering that most elementary school teachers, and also secondary school teachers of social studies and English, have had only a sketchy background for science instruction, these comments are not strange. Considering that all of the eighth grade and many of the seventh grade Common Learnings classes were conducted in secondary school buildings where special science courses were offered by specially trained teachers, this overmodest attitude of the seventh and eighth grade teachers is quite understandable.

Four-Week Workshop

After two years it had become obvious that some organized help should be offered. The decision to provide it in the form of a four-week workshop (June 9—July 13, 1947) was taken. A preliminary enrolment blank listed eight aspects of the General Education program with which the staff could deal—science activities, guidance, audio-visual aids, child development, evaluation, cooperative planning, administration, community resources—and asked for further suggestions. Groups were finally organized in guidance, cooperative planning, and science.

Meeting with their special consultant, Dr. Ralph Preston, of the University of Pennsylvania, this group of teachers began the first day's discussion by raising some questions as to what they wanted from a science workshop. These were typical: Can the natural interest of young people in science be used as a correlated part of their common heritage? Can scienti-

fic facts be made a part of the child's daily living? Does the teaching of science have to deal with abstract principles in specific areas? Can the teaching of science equip the child for living in a changing modern world?

The most insistent question was: Can the materials in science be correlated with language arts and the social sciences?

Natural Intersections

The consenus of opinion was that to stress correlation would be limiting rather than helpful. It was further agreed that a specific unit need not start or stop in a particular learning experience. The relationship of science to other subjects should come through a natural intersection with that other concern or no relationship should be attempted. Since those intersections vary according to the class, it was determined that varied suggestions as to possible orientation, given with each discussion of source material, would be more helpful than details on recommended correlations.

Since the world is in need of scientists, and even more in need of persons who not only take responsibility for self but also for society, it was felt that it would be well to encourage children to experiment in the truly scientific way. Let the study of science give much practice in thinking (a social requirement), as well as much opportunity for teaching actual science learnings, plus responsibility toward society as well as self.

Having agreed on these basic attitudes, three science topics were chosen for detailed study from the wealth of material in the Kansas City Course of Study. These were *weather, conservation,* and *machines.*

The source materials were science books, science magazines, equipment from the laboratories available for use in the schools, and equipment brought from home. These were placed in the science room at the Workshop for use at all times.

The group was divided into three committees. Each committee worked out in detail one topic—the members in each group being those most interested in that topic. A chairman was chosen to lead each committee.

Because of the different backgrounds of teaching, there was no lack of problems or material in the group. All took an active part in the discussions.

Methods of approach previously found sucessful were discussed. Most usable among the many suggestions seemed to be books, magazines, visual aids, exhibits, neighborhood environment, radio programs, and excursions.

Organization of Questions

From this approach many questions for study were raised and written on the blackboard. These questions were then organized into three groups: (1) those questions that can most profitably be answered by experiment or observation, (Do rocks crack when heated?); (2) those questions that can most profitably be answered by referring to an authority, (Why is conservation necessary?); (3) those questions that cannot be answered, (Why did the great glacier stop at the Missouri River?).

Now came the opportunity for good cooperative planning!

The committee divided into small groups to perform the experiments in connection with the questions considered solvable. Information necessary

for the experiments was obtained from the library provided for the research of the group. It was found neither necessary nor desirable to have standard science equipment in readiness for experimental purposes; it was preferable to make use of materials which children themselves could supply. With their own milk bottles, soda straws, rubber balloons, nails, charcoal from a fireplace, tin cans, matches, candles, and pop bottles, their interest will be centered on the working out of an experiment rather than the wonder of a piece of equipment.

The textbook was used only to answer the questions that must be referred to an authority.

Experiments were selected with the idea of bringing out the most important concepts of the topic under discussion.

In conclusion, a careful study was made of the main concepts presented. An evaluation of the study was carried out to determine whether there had been an increase in familiarity with the subject.

The findings were mimeographed in a supplementary bulletin for teachers to use along with the Outline of Content in the Program of Grades Seven and Eight. This bulletin may be obtained from the Curriculum Department of the Kansas City, Missouri, Public Schools.

Good instruction in a workshop is a most important factor—no matter what other favorable conditions for learning are provided. The instructor who *teaches from within the group,* as in the workshop situation, has many opportunities to stimulate and direct, but in this he must be skillful. Members of our Workshop particularly appreciated these characteristics: (1) Keeping in operation, within the special study group, the friendly participative atmosphere created by the general setup of the over-all workshop. (2) Answering questions and helping to solve problems in simple language, using concepts and principles on the level from which the problem arose. (3) Developing genuine interest in further study by making openings, giving insights, and indicating related activities. From the viewpoint of members and staff alike, this workshop experience vindicated our belief in this kind of teaching and learning process.

Science workshops have varied purposes. Don't mix them! Here are clear distinctions.

Varied Purposes *of* Science Workshops

By HUBERT J. DAVIS

General Supervisor, Norfolk County Teaching Aids Library, Portsmouth, Virginia

THE science workshop procedure is sound psychologically and educationally. It eliminates some of the undesirable practices of the conventional type classes, and provides many additional advantages. Its most attractive feature is the opportunity it affords for participants to learn by doing. Viewing in retrospect more than a dozen science workshops with which I have been associated as participant, consultant, or director, I find that they all follow a fundamental plan of organization and procedure.

Science workshops may be grouped according to the purpose for which they are held as (1) professional growth, (2) production of new materials, and (3) orientation and evaluation.

Duties of the Director

The sponsoring agency of the workshop selects the director, who does the basic planning. This includes outlining the broad objectives, engaging guest speakers, selecting consultants, providing for adequate conference rooms, assembling needed materials, and, if it is a production workshop, plans for the editing and duplicating of the materials.

The purpose for which the workshop is held determines the basis for selecting the members. Cooperative planning of activities and content is essential for the success of the workshop. This planning is usually done after the members of the group assemble. They decide upon the working hours, methods for presenting, discussing, and evaluating the materials, schedules for the lectures, provisions for individual conferences with consultants, and plans for research and study. In the *professional growth workshop* the problems selected by the individuals usually determine the content. Where examinations are given, the group often works out its own examination problems with the director.

The mornings are usually given over to such activities as lectures, progress reports, group discussions, and special presentations. The afternoons are devoted to research, field trips, and organization of materials. After the preliminary work is well underway, the leader should guide the workers in analysis, evaluation, and organization of materials. He should at all times provide guidance in coordinating individual activities with the overall objectives of the workshop.

Evaluation Workshop

In the summer of 1940, I had the privilege of participating as chairman of the science section in an *evaluation workshop* at the College of William and Mary. This workshop was conducted simultaneously with several

similar workshops in colleges and universities throughout the South. It was sponsored by the Southern Association of Colleges and Secondary Schools. These workshops evaluated the findings of the Committee for the Eight Year Study for Curriculum Improvement. Dr. K. J. Hoke, head of the Department of Education, College of William and Mary, served as director. Educators from the leading colleges in the South and experts from the United States Office of Education served as consultants. The members of the workshop group were selected from the forty experimental schools which had participated in the study.

Similar Techniques

The techniques used in conducting this workshop were not very different from those described above. The group evaluated the research findings, made recommendations to the editing committee, and planned ways of inaugurating the recommended procedures in the science curriculum. A complete report of the work of the Eight Year Study has been published as a digest and in book form.

The recommendations from this group were adopted by the Eight Year Study Committee. However, the professional growth of the participants was probably the most valuable outcome. Each of the members had developed basic interests and opinions concerning the study before attending the workshop. Therefore, there were no disinterested or silent members. It was often necessary for the chairman of the group to restrict the discussion by the opinionated and wordy members.

As a participant, I attended a most successful *orientation workshop* at the College of William and Mary in 1945. This was a resource-use workshop sponsored by the Virginia State Department of Education, and directed by the Supervisor of Conservation Studies. This workshop was one of a series of two-week workshops held each summer at the College of William and Mary, Virginia Polytechnic Institute, Virginia State Teachers College, Farmville State Teachers College, and the University of Virginia. These workshops were devoted to the use and conservation of the resources of Virginia and the South.

For the William and Mary workshop, a teacher was selected from each of the school divisions in the Tidewater region. Supervisors, principals, and interested laymen were also enroled. The expenses were borne jointly by the respective divisions and the State Department of Education.

This workshop attempted to provide teachers with basic information on Virginia resources. The participants were given an opportunity to become acquainted with literature in the field, and agencies of their communities which could contribute to their school program. The workshop provided opportunities for the teachers to develop teaching plans under the guidance of experts in resource-use and curriculum making.

Careful Pre-planning

This workshop was characterized by careful pre-planning by the director and his consultants. Participants selected their own topics on soil, forests, and marine life. Those with similar interests worked together in small committees. Each group carried on research, discussed their findings, shared their experiences, and presented progress reports.

A comprehensive examination covering subject matter, methods, and atti-

tudes was given at the close of the workshop. Summaries of lectures, class presentations, and a bibliography of the source materials were compiled and duplicated. No additional copies of this material are available.

Production-type Workshop

During the summers of 1946 and 1947, I served as chairman of a science group in two *production-type workshops* sponsored by the Department of Education. These workshops developed a course of study for the eighth grade in Virginia schools. The workshops lasted for three weeks.

Successful science teachers from each type of high school in the state were invited to participate. This brought together experienced teachers in all fields of highschool science. The director was selected by the State Department of Education. He selected the committee chairmen, consultants, and advisors. When the workshop members assembled, they planned the general procedure for conducting the work. No credit was given. Members were paid traveling and living expenses.

The general plan for this workshop was somewhat different from the evaluation workshop mentioned above. The first day the director assigned each member to a committee. He outlined the problems to be undertaken, and set a definite time limit for the production of the first rough draft of materials.

The chairman met with his committee and assigned each member some particular phase of the work. The materials, such as books, pamphlets, and curriculum manuals, were placed in the committee rooms. The committee spent the first few days getting acquainted with the work which had been done in other states. After this orientation, specific objectives for the committee were stated and a work outline adopted.

As the work progressed, the members presented materials which were discussed by the committee. A consultant guided the selection and organization of the materials. The chairman summarized these reports and periodically presented them to the entire workshop group. This group discussed and evaluated the work, and either adopted or rejected it. After many revisions and re-workings, a rough draft from each committee was prepared for the editing committee which provided edited copies for the workshop committees. After further discussion and revision, it was finally accepted and duplicated.

These workshops were held primarily to produce a course of study, but the professional growth of each participant from the experience of selecting and organizing the materials was probably the most valuable outcome.

The State Department of Education has published the eighth grade course of study which is available in limited quantities.

Production Workshops

Norfolk County Schools held *production workshops* for three weeks each during the summers of 1945, 1946, and 1947. I served as consultant to the science group. These were conducted to produce a course of study for the elementary and highschool curricula.

The personnel for these workshops was selected from the Norfolk County teachers by the instructional staff. The workshop was conducted as an extension of the regular school term, and

the participants were carried on the payroll. The teachers were selected on the basis of training, successful experience, and professional interest. Careful selection resulted in very few non-participating members in the group. The very serious attitude, and the keen rivalry between the science and the other subject matter groups, soon led to effective group disapproval of loafing or garrulousness. The plan of organization and procedure was the same as that of the State Department of Education Course of Study Workshop. A limited number of copies of this course of study is available.

Professional Growth Workshop

I had the responsibility of directing a *professional growth workshop* during the summer of 1947 at the University of Virginia. The membership of this workshop was selected from science teachers all over the state. Only qualified science teachers interested in working on some problem in elementary or highschool science were accepted. This workshop carried two semester hours credit, and lasted for two weeks.

Several topics were so well presented that the group requested they be written up and duplicated for each member. This resulted in a bulletin with many helpful teaching suggestions and a complete bibliography of source materials.

Abuses of the workshop methods have resulted in unfair condemnation of workshops by many educators. I think the success or failure of a science workshop depends largely upon three factors. The leadership is the first and most important. The director must be experienced, alert, and well trained. He does not need to be a specialist in any one field, but should be thoroughly familiar with the modern methods of teaching science. He needs to understand the fundamentals of curriculum building; to have had experience in guidance and in the organization of materials; and must do a great deal of careful pre-planning.

The success or failure of the workshop often depends upon the ability of the director to perform his function during the first two or three days. He should clearly outline the general objectives for the workshop, and stimulate participants to select several possible problems most significant for their attention. He should help each member to limit the scope of his problems in order that they may be adequately treated in the allotted time.

The selection of participants in the workshop is the second important factor of success. Loafers and credit-seekers do not have a place in the workshop. The members should be selected on the basis of their interests, needs, experiences, training, and willingness to contribute to the over-all objectives.

The third factor of success depends upon the materials which are provided for the work. There should be an abundance and a wide variety of well selected materials. There should be books, bulletins, pamphlets, audio-visual aids, facilities for taking field trips, laboratory materials, and duplicating facilities.

The Guidance Viewpoint

The science workshop procedure approaches the teachers' problems and activities from the guidance viewpoint. There is more danger of over-seriousness than indifference, and invariably the participants reveal increased professional growth. I do not believe a sounder teaching device could be devised than the successful science workshop.

How about a three-summer sequence of workshops, with plans put to test on the regular teaching job? The idea is here.

Putting Workshop Ideas To Work

By DONALD G. DECKER

Associate Professor of Science, Colorado State College of Education, Greeley, Colorado

THE science division of Colorado State College of Education at Greeley, Colorado, has inaugurated an experimental workshop type of program as a regular offering for summer school students who are teachers of science and mathematics. The first experimental group was organized during the regular summer session (June 21-August 15) of 1947.

A Planning Group

The science division wished to make the first group a planning group and to organize the future workshop activities with the suggestions and help of the initial group. As students inquired about the workshop during registration, the purposes were explained and members were invited if they were interested in working to improve their teaching or their curriculums.

The teaching experience of the members varied from four to twenty-four years. The members were from five different states. Junior high school, senior high school, and freshman college levels were presented. Some of the members were administrators, some were teachers, and some were members of special curriculum committees in their schools.

The first major activity of each member was to present information to the group about the community in which his school was located, about his school, and about the science and mathematics program in his school. As these reports were given, members asked questions and suggested information which should be included in the final report. Individuals became acquainted with each other and with a variety of communities, schools, and science and mathematics programs.

The second major activity was to review reports made by other science and mathematics teachers to discover what their school systems were like, what kinds of problems these teachers had found important to study, and the results of the studies. The analyses of these reports formed the basis for the criteria which were developed to evaluate the problems and reports of the group.

Identification and Explanation

The third major activity of each member was to identify and explain the problem which he was interested in solving. Each other member was to offer concrete, constructive criticism for the clarification of problems and plans for solving them.

The tendency to make wordy and vague suggestions and to discuss topics irrelevant to the problem was eliminated by establishing a criterion by which the group might judge the effectiveness of a suggestion. The crite-

rion for discussion was formulated as follows: "If parents were listening to us as we plan the programs for their children for the next year, would they believe that we are a competent professional group who should be educating their children and who know the experiences in science the children should have?" The criterion was applied to the discussions of the group during the regular meeting period. As a result members became more conscious of the necessity of thinking before speaking.

The fourth major activity was the reorganization of the problems and the plans, and the final reporting to the group of the plans which were to be placed into action the following school year.

During the above major activities many related activities were discovered to be important and time was devoted to them.

At the termination of workshop activities the final reports of the members were completed. As a result of the experiences of the first group and in cooperation with their suggestions the following program has been outlined which will be part of the regular science division offerings during the summer schools of the future.

Basis for Future Study

Section I. *Course title*: Analysis of Science and Mathematics Curriculum. *Staff*: directors of elementary school science, secondary school science, mathematics. *Who is eligible*: any teacher or administrator who wishes to analyze his science teaching or program and make plans for its improvement; must be willing to spend three summers in workshop activities, and two years of experimentation in his school.

Section II. *Course title*: Reconstruction of Science and Mathematics Curriculums. *Staff*: same directors as in Course I. *Who is eligible*: those who have completed the first course (Section I), have experimented for one year with their plans in their own schools, and who wish to evaluate their work and make better plans.

Section III. *Course title*: Evaluation of Science and Mathematics Curriculums. *Staff*: same directors as in Courses I and II. *Who is eligible*: those who have completed the first and second courses (Sections I and II), have experimented for two years with their plans in their own schools, and are ready to make a final evaluation and recommendations for the improvement of their science teaching programs.

Philosophy and Principles

The practices which improve science education begin as ideas in the mind of the science teacher. Experiences are worthwhile if they make possible the creative thought which is essential to the development of these ideas. When a teacher is busy with the daily routine of school activities, it is difficult to discover a period of time which can be devoted to a conscientious, sincere, prolonged analysis of his instructional problems. Yet this analysis is a necessary forerunner to the improvement of instruction. Periods free from other responsibilities are a requisite to long-range planning for the improvement of instruction. For these reasons teachers have enjoyed workshop types of activities during periods when their thinking

can be devoted to ideas for improvement.

All workshop experiences do not automatically improve a teacher. Merely gathering together in groups and "hashing over pet peeves and gripes" does not result in experiences which necessarily create ideas for improvement. Making workshops places for learning "how to socialize" does not create ideas either. Adults engaged in professional work should be able to provide their own recreation when professional responsibilities are completed.

The task of becoming a better teacher is professionally challenging and requires laborious, continuous work as does the solution of any scientific problem. The success of the experience cannot be measured by the variety of workshop experiences, but only by the improved practices which follow in the classroom.

Essential Activities

The following activities are essential for a worthwhile workshop for the improvement of science instruction:

1. The analysis of the science program, the school, and the community.
2. The statement of the problem that is most important for solution.
3. The formulating of plans to solve the problem.
4. The "trying out" of the plans in the classroom.
5. The reorganization of the plans after the experience of trying them in classroom activities.
6. The "trying out" of the reorganized plans.
7. The final evaluation and selection of the practices which are known to be better than former practices.

The accomplishment of these is at least a three year experience. Sudden and continual change is poor. The ideas for improvement should be based upon analysis, practice, reorganization, further practice, and evaluation so that the final practices for improvement are selected because they are better, have been demonstrated as better, and are accepted as better by the teacher who is to incorporate them into a final scheme for the improvement of a science program. They should also be accepted as better by the students for whom they are actually designed.

Workshop Stumbling Blocks

1. Teachers who may wish to have handed to them programs for improvement. If a teacher cannot become creative, his practices will not improve.
2. Teachers who make general well-sounding statements and plans that are impossible to practice.
3. Teachers who criticize adversely more freely than they give constructive suggestions.
4. Teachers who write voluminously about generalities, but fail to be specific about a practice.
5. Teachers who require too long a time to change their points of view and therefore cannot make suggestions for improvement.
6. Teachers who do not examine what they really believe before they begin to make new plans.
7. Teachers who change too quickly, make errors, and become frustrated trying to improve.
8. Teachers who fail to plan classroom activities cooperatively with their students.

9. Teachers who have no objectives by which to evaluate their present practices.

10. Teachers who do not consider the other parts of the school when making their plans.

Worthwhile Workshop Experiences

1. The experience of selecting the science experiences they believe are most important for children to have.

2. The experience of selecting basic fundamental concepts and selecting the applications most pertinent for their groups.

3. The experience of thinking and expressing ideas so exactly and definitely that others understand the ideas.

4. The experience of exchanging viewpoints and altering their own opinions.

5. The experience of examining what they do and why they do it.

6. The experience of examining the relationships of society, the individual, and education.

7. The experience of listing the values they believe important in science education.

8. The experience of selecting what they believe is worthwihle for all and for a few.

9. The experience of analyzing the learning process.

10. The experience of examining a variety of attempts by others to improve science education.

FOR TEACHERS OF ENGLISH

New type objective examinations in English Literature prepared by Harold T. Eaton, Head of the English Department, High School, Brockton, Mass. Each examination covers such points as Character, Setting, Plot, Identification of Speeches, etc. The Eaton Literature Tests cover the following:

A Tale of Two Cities
Franklin's Autobiography
Burke's Speech
Macbeth
Julius Caesar
As You Like It
Merchant of Venice
Lady of the Lake
The Odyssey
Lorna Doone
King Henry V
Silas Marner
Ivanhoe
The Ancient Mariner
Treasure Island
Hamlet
House of Seven Gables
The Vision of Sir Launfal
Snowbound
The Last of the Mohicans
Twelfth Night
Idylls of the King
Sketch Book
Milton's Minor Poems
Life of Johnson
Midsummer Night's Dream
The Mill on the Floss
David Copperfield
Carlyle's Essay on Burns
Tales of a Wayside Inn
Inland Voyage and Travels with a Donkey
Courtship of Miles Standish
Sohrab and Rustum
Spectator Papers
Evangeline
Webster's First Bunker Hill Oration and Washington's Farewell Address
Browning's Poems
Christmas Carol

The Eaton Literature Tests are so inexpensive that any school can afford to use them. They are class tested and used in thousands of schools.

Prices

Single copies, 10c each; In quantities for class use, $3.00 per hundred

THE PALMER COMPANY

370 Atlantic Avenue **Boston, Mass.**

Would a State Bulletin on science teaching be helpful? Florida workshops wrote two last summer.

Florida's Guide *to the* Teaching *of* Science *in* Secondary Schools

By EDWARD B. HENDERSON

Supervisory Staff, State Department of Education, Tallahassee, Florida

FLORIDA'S *Brief Guide to the Teaching of Science in Secondary Schools* was prepared by a workshop group at the University of Florida, Gainesville, during the summer of 1947. The Workshop ran from June 4 to July 17, under the joint sponsorship of the University and the Florida State Department of Education. Publication is expected to be completed about the first of this month.

During the same period a workshop group prepared material for a bulletin, *Brief Guide to the Teaching of Science in Elementary Schools,* during sessions at Florida State University, Tallahassee, Florida. Publication of the two bulletins will offer guidance for science instruction at all levels in the public schools of the state.

Earlier Effort

These groups completed a task begun in 1937, since Florida's first attempt at the preparation of curriculum and teaching guides through the workshop procedure was concerned with science teaching. Those taking part in this early effort found themselves unprepared and without a widely accepted philosophy and point of view within which to develop the teaching aids. This deficiency was soon met through an intensive workshop program to develop cooperatively by teachers, principals, superintendents, supervisors, the State Department of Education, and the University, an adequate statement of principles upon which to develop teaching guides.

Inadequate Science Aids

Since 1939, Florida has prepared a fine series of curriculum and teaching guides—all developed through the workshop method. Most of the work has been done by teachers, the majority of whom attended the workshops at their own expense to have a part in this important work. By 1947, guides had been prepared in all of the basic fields of study except science. Through the years there have been repeated requests for science aids, but the early failure apparently discouraged those who might have undertaken the project. However, in 1946, the State Course of Study Committee asked for the preparation of the science guides on both elementary and secondary levels. This account describes the planning, preparation, and content of the bulletin devoted to highschool science. The bulletin on the elementary level is, of course, equally worthy of detailed reporting, but the space allot-

ted to this article does not permit the presentation.

Of prime importance in the planning was the selection of personnel, as the group would be expected to prepare materials for publication—materials which would be of real value to teachers of the sciences. The first need[1] was to have the help of a nationally recognized science educator. Dr. Hanor A. Webb, of George Peabody College for Teachers, Nashville, Tennessee, editor of *Current Science,* filled this first need. His experience as teacher, author, and consultant, and his abundant patience and understanding, were invaluable.

The second need was for someone who was demonstrating continuously the best practices in teaching the sciences to young people. This need was met by W. L. Goette, teacher of science in the P. K. Yonge Laboratory School, University of Florida, who has been demonstrating for years that the sciences can be taught by methods which make science a very live study.

The third need was for the group to include only successful teachers, and that all fields of instruction in science be represented.

Personnel Difficulties

To locate participating personnel was more difficult. County superintendents, supervisors, and principals were contacted for information on successful science teaching. State supervisors were asked to help locate outstanding examples of successful laboratory and classroom work. As names were submitted, the individuals were contacted informally by the director, to determine interest and availability of the teachers for the summer work. To a selected group of teachers and principals, State Superintendent of Public Instruction Colin English sent personal letters of invitation to participate in the Workshop. Most of those accepting the invitation received some financial assistance through their county superintendents from Florida's Summer Scholarships for Teachers fund. The Workshop was available to any interested science teachers who may have been overlooked, and one valuable participant elected the course.

Variety of Experience

On June 4, fifteen participants started getting acquainted with each other and with their tasks in the Workshop. Teaching experience ranged from one year to thirty-five years. Every subject in the field of high-school science was represented by at least two teachers. There was representation from several very large city schools and from several medium and small schools. Some of the teachers had at their command all the equipment wanted or needed, while some were teaching with very little specially manufactured scientific equipment.

Several items were considered important before writing was undertaken. The participants should know each other and eath other's background; they should understand the basic philosophy upon which Florida's instructional program is being developed; they should know the proper place of science in relation to the total

1 In his modesty the writer of this article fails to list the true *first need* of a workshop—an efficient director. The responsibilities of directors are clearly emphasized in other articles of this issue. Mr. Henderson ably served in this capacity from the initial planning of the workshop to the final editing of the manuscript.

— EDITOR.

curriculum; they should be familiar with related materials previously prepared; they should accept, within the outline of State Board of Education regulations, the responsibilities properly assigned to this group; they should adopt for themselves definite objectives and plan accordingly. This orientation to the task required several days.

As soon as the orientation was well under way, the group selected its own chairman and secretary. The director [Mr. Henderson] served with Dr. Webb and Mr. Goette as a consultant and advisor. This plan permitted a greater amount of freedom to the participants and produced a splendid *esprit de corps,* and fine personal working relationships. Among the noteworthy things about this group was the splendid attitude of "give and take." Statements and proposals were challenged and counter-challenged vigorously, and many times bluntly, without arousing feelings to hinder cooperative endeavor. The participants were scientific in practice as well as in theory. Another factor of importance was the seriousness all displayed in their work. There just wasn't any wasted time.

Social Life

Social acquaintance was considered important, and opportunities for developing friendships included the regular mid-morning break around the cold drink stand, a watermelon cutting, a trip to Florida State University to consult with the elementary science group, a luncheon, and several field trips.

After examining all available manuals and bulletins on science teaching, the group decision was against including syllabuses or outlines of courses of study in the *Guide.* The only exception was the simple outline of the recommended seventh and eighth grade two-year block in Science, Health, and Home Living. It was determined that the Florida program would benefit most from a guide to *the teaching* of the courses being offered.

Four Part Guide

The *Guide* is developed in four parts. Part I includes a point of view of the over-all responsibilities and purposes of the science teacher, the scope and sequence of the elementary science program, and the special objectives or purposes for having science instruction in the curriculum.

Part II contains special suggestions for improving the quality of instruction in the special subjects of high-school sciences. This advice comes mainly from the teaching experiences of the participants and consultants, but includes some recommendations from outstanding authorities. The material should appeal to teachers who wish to enliven their work and make it of very practical application, and should aid those teachers who because of their background are prone to remain "textbook" teachers. The viewpoint of the suggestions is that youths are in the midst of many personal and social changes at the time they are in the high schools; that the sciences are fine tools by which to assist these young folks to understand themselves and the world in which they live, and to adjust to the requirements of life about them.

Part III, entitled Aids in the Teaching of Science, includes seventeen sections specifically asked for by

teachers. Section 1, Reading as a Tool for Science, emphasizes the importance of coming to understand the language before trying to apply it in understanding a course, and describes a plan for reading instruction in the science courses which is producing good results in certain classrooms.

Other important sections of Part III are: Mathematics in Science, where suggestions are given for overcoming the fear many pupils have of the mathematics work connected with science; Audio-visual Devices, as they can be applied to science teaching; Field Trips, with suggestions for gaining and keeping a cooperative attitude on the part of the principal, fellow teachers who may be sometimes disturbed by passing pupils, and laymen whose establishments are visited; Laboratory and Classroom Integrated Procedures; Evaluation and Testing; The Book of Genesis and Science,[2] which attempts to help the teacher meet the often presented problem of the so-called "fundamentalist" attitude toward some of the theories of science; and several short sections addressed directly to the teacher.

Part IV includes specific suggestions for starting the small laboratory in biology, chemistry, and physics. Materials are arranged in three categories: those which can be, and should be, made by pupils and teacher; those which can be borrowed or obtained locally; those which must be purchased. Others sections give lists of reference materials, professional books and magazines for teachers and pupils, reading lists, suggested tests, source lists, trade publications, and names of publishers and scientific supply houses.

The state of Florida has adopted the workshop method for the preparation of its bulletin because bulletins so prepared are usually accepted more freely by other teachers. It has been found that those who participate in the workshop help to bring about a use of the materials. They all go from the workshops with a much better knowledge of the state program, its philosophy, and procedures. It is felt that the workshop experiences produce more professional growth and better understanding than the regular class method of work.

2 This discussion of Genesis and Science is unique in guides for science teachers. Since so many science teachers are challenged to reconcile their teachings with the stories of Creation in the Old Testament, and to justify man's inclusion in the list of evolved mammals, the Workshop group felt it to be their duty to include this topic as a needed help.

While the line of reasoning may satisfy neither the narrower theologians nor the cynical scientists, it did seem sound to a group that believe sincerely in a Creator, and in man as a creature partly physical, and partly spiritual. The reactions of other science teachers throughout the nation will be awaited with interest. — EDITOR.

What are the chief needs of science teachers in small high schools? A workshop gave answers.

The Science Workshop: University *of* Maine

By ROBERT N. KING
Glens Falls High School, Glens Falls, New York

"I'M the science teacher in a two-teacher school in Maine. I don't know what this workshop idea can do for me, but I'm trying to find a way to improve my science course." This statement characterized the attitude of the students of the Science Workshop last summer at the University of Maine.

The University of Maine Workshop was held for a three-week period from June 30 to July 18, 1947. One section, the science group, concentrated its attention on science teaching in the secondary schools. Similar groups dealt with administration, guidance, home economics, social studies, English, and physical education. All members of the science group were teachers in small high schools.

Plan of Operation

The plan of operation was simple. The entire Workshop met for an hour in the morning to plan its program for the day, then divided into individual sections to carry on specialized study. The general assembly allowed time for speakers of broad interest on such subjects as evaluation, teaching methods, philosophy, and group leadership. The general assembly was used later for reports, allowing the entire Workshop to discuss, criticize, and become acquainted with the work of the special groups.

The science group was small, a fact that permitted an informal atmosphere, free discussions, and a liberal exchange of ideas and information. The disadvantage of the small group was the limited total experience of the members. Frequent use of experts from the U. S. Office of Education, from the state department, and from the college faculty was made to offset this limitation.

The First Day

The first meeting was used for exploratory purposes. After getting acquainted, swapping a few stories, and describing local teaching situations, the group attacked the question: What do we want to accomplish this summer? Discussion revealed that there was a definite similarity of problems; that is, each member taught science in a small high school and each was interested in making science a more meaningful part of the curriculum. It was decided by the group to analyze two subjects:

1. *In what kind of community do I teach?* What are its important industries, population, geography, churches, businesses, leisure time activities, its home life, health prob-

lems, economic difficulties, and social habits? How can science contribute to life in the community?

2. *What kind of students do I teach?* How many are there, what will they do when they graduate, what are their interests, abilities, hobbies, recreational facilities, and spare time occupations? How can science contribute to the life of the student?

The analysis of local communities and student bodies revealed two interesting discrepancies. First, almost 90 percent of the student body stayed in the highschool community in local jobs after graduation, yet the schools were teaching traditional college preparatory courses. Second, the community offered a wide scope of science problems that could be used directly in the science courses of the secondary schools, yet these were largely neglected for textbook work. For example, one community which depended largely on blueberry culture for its survival had never used the study of this industry as a basis for teaching conservation. The textbook dealt with soil and forest conservation instead.

The First Problem

A vigorous discussion of the community and student survey helped to formulate the first problem. It was decided that, as a group, we would analyze the problem: What changes should be made in the science curriculum in the secondary schools of Maine? The afternoons were spent in library research, reading, and writing; the mornings were spent in heated discussions to summarize our collective thinking. This culminated in the publication of "Some Suggested Changes in the Science Curriculum in the Secondary Schools of Maine"[1] The actual writing was done by the chairman of the group after the problem had been thoroughly discussed and modified by the members. One of the nine changes recommended will illustrate the direction of group thinking:

1. *Change the content of the science course now taught to include*:

a. Practical and functional illustrations and experiments from everyday living.

b. Problems and situations the student will face when graduating into any community.

c. Materials that will stimulate the interests of students to go beyond classwork.

d. Problem-solving situations that will develop the scientific attitude.

e. Tests for interests, appreciations, and attitudes, as well as for information.

The Second Problem

Approval of curriculum changes was received from the Maine State Education Department before the group launched itself into the second phase of its workshop experience. This was to prepare certain units of work and some complete outlines of courses to be used in the fall. At this point individual efforts began. The mornings were devoted to group discussions on how to write science units and science course outlines, but the afternoons were spent in individual research, writing, and consultation. It is interesting to note here that everyone completed at least one full unit as well as mastering a technique of organizing teacher materials. A com-

1 Copies may be obtained free from the Education Department, University of Maine, Orono, Maine.

ment of one student was significant: "I've taken education courses for years, but this is the first time I've been able to put it to work in the fall."

The evaluation of the work done by the science group came about in an indirect manner. The administrative group of the Workshop had read our "Suggested Changes in Science Curriculum," and asked an audience to discuss how administrators might assist in such a science program. The science teachers spent a morning outlining curriculum changes and explained the individual work completed. The questions of the superintendents and principals were better than any pencil and paper test that could have been devised on the spur of the moment. Further testing occurred at the conclusion of the Workshop when our program was presented to the entire Workshop for questioning and criticism.

Values of the Workshop Method

What are the values of a workshop experience for science teachers? The greatest is to learn the *techniques* of organizing, stating, and analyzing a problem in science teaching, collecting data, and preparing practical materials for classroom use. With such techniques, any teacher can continue to improve under his own impetus without asking an "expert" to solve his problems. Related to this is the help received by exchanging experiences with other teachers confronted by similar problems.

Another value of a workshop is its power to stimulate the interest of administrators and teachers of other subject-matter fields. This gives an opportunity for an understanding of the common problems of several groups. One administrator, whose science teacher was in the science group, promised full cooperation in revision of science courses in his school. How science teachers would welcome a similar attitude on the part of all administrators!

The value to the student in the Maine Workshop was that his summer's work applied directly to his teaching job. He planned and prepared materials that he would use in his own school rather than lessons to meet the requirements of some college subject. Further, as he guided his own studying, he employed the new techniques that he would try to teach his students. An almost complete departure was made from the formal college lecture-recitation system.

Criteria for a Successful Workshop

The science group adopted as the best criterion for a successful workshop: Will the workshop experience make me a better teacher in the fall? To evaluate the summer's work, the University of Maine and the State Education Department agreed to follow the teaching programs of many of the students. For example, three Maine high schools are now testing the science materials prepared during the summer. Reports from these schools will not only measure the work of last summer but will serve as a basis of revision of work next summer.

Is your workshop to continue summer after summer? Here are long-term plans.

The Workshop *as an* Agency *for* Professional Education *of* Science Teachers[1]

By SAMUEL RALPH POWERS
Professor of Natural Sciences, Teachers College, Columbia University, New York, New York
and ANITA D. LATON
Associate Professor of Health and Hygiene, San Jose State College, San Jose, California

A SERIES of summer workshops, the first of which was held in 1939, was planned to continue through a number of years. These were part of a larger undertaking by the Teachers College, Columbia University, Bureau of Educational Research in Science carried on to help teachers achieve a working understanding of the ways in which scientific methods and discoveries are affecting life of today. The workshops were conducted as part of a cooperative enterprise of the Bureau and a number of selected high schools, most of which were located in large cities. This cooperation continued for three years. The arrangements were made and the preliminary planning was done through conferences with the chief administrative officer in each of the selected schools.

Nonresident Members

One science teacher from each school was asked to serve for the duration of the project as a nonresident member of the Bureau staff. This teacher assumed responsibility for the work that was to be undertaken in the school in which he was employed. These nonresident members assembled at Teachers College during summers, and the workshop became the center in which the planning was done for the school year that was to follow.

Purposes and Plans

The cooperating teachers, along with a resident staff, assembled first during the summer of 1940. A report on experiences in a workshop of the preceding summer was available, together with reports in the form of teaching suggestions completed or in preparation by resident members of the staff and from other sources. While making plans for the summer's work, the discussions of these teachers centered directly upon their own needs. There was general agreement that the chief need was for better understanding of their own communities and of the impact of the local situation on the young people in their classes.

Meeting in small groups and with

1 From the forthcoming Report of the Bureau of Educational Research in Science of Teachers College, Columbia University, *New Directions in Science Education*, to be published by McGraw-Hill Book Company, Inc.

the assistance of able consultants, the teachers worked to extend their own education in selected areas and also to prepare teaching materials suitable to the maturity levels of their own classes. All were interested in a realistic approach to the problems of evaluation, especially in methods and instruments that would help them detect both their failures and their successes. Each one assumed responsibility for adapting the summer's work to his own school and for seeing to it that the plan was actually carried out. In most instances, the cooperating teacher planned to enlist the help of his colleagues in the school in which he was employed, and thus to extend the force of his work throughout the school.

In general, the plans followed in the workshops of the successive summers were similar. The planning was guided by an assumption that the function of the school is to present opportunities for youth to achieve a "useful" education, that is, an education rooted in the needs of the students. The term *useful* was never interpreted narrowly to mean *trade education,* but broadly and in terms of the teacher's experience and the experiences of his students. This assumption led to the community as a source of information and education, for it is in the community that students and their parents operate, where their problems are found and where the school is best able to offer a truly useful education.

The Method of Working

The participants came to the workshops with at least a partial plan of work. In most cases the plans had been discussed with the administrators in the schools in which the participants were employed and in many cases were based on work already in progress. The members of the staff held themselves in readiness to assist individuals, to take leadership of groups working in the fields of their own special interests, and to provide other resources as needed. There were general meetings, group conferences, and field trips. Opportunity was open for participation in college and university courses when the need for such participation was recognized.

General Meetings

General meetings were held in the mornings, and there were some other meetings which all attended. Each participant described his own school and the school community, calling attention to the nature of the school and community relations and the problems and interests that locally engaged public attention. He described the student body, recognizing degree of selectivity and occupational opportunities. Following this general description, he centered attention on his own plans for the summer and for the ensuing year. There was discussion of Bureau publications and of special studies in which progress had already been made. A prominent feature of these meetings was the discussion of special interests. When these interests were voiced, there followed discussions, sometimes led by regular members of the staff, but when the need arose recognized authorities from outside the regular staff were invited to take leadership.

There were many group conferences. Some of these carried on from one year to the next with study of the same topics. In some instances the

topic was dealt with in a single meeting or in only a few meetings. Some of the continuing studies were of health education, human development and changes through the human life span, scientific method, public and private housing, intercultural problems, community resources and community planning, evaluation, integrated courses, and economic trends.

In the group conferences attention was centered on studies by the participants to extend their own education in areas judged to be important to them, not only as teachers but also as interested adults living in the world of today. They also pursued studies of how to modify teaching practices so as to make possible greater success in helping young people achieve useful education.

Field trips in general grew out of the group conferences. The discussions of health, housing, intercultural relations, community resources and community planning were supplemented by field observation and study of how these matters were dealt with in New York City. Similarly, the social life could appropriately be thought of as an integral part of the total experience. It included meetings at lunch and dinner, and other informal occasions, visits to the theatres, churches, parks, and cultural centers. These meetings were at the same time both professional and avocational and characterized the workshop as an opportunity for people with vital common interests to meet together and discuss as mature individuals the things in which they were most interested.

Illustrations:

Work Undertaken in the Schools

The "useful education" undertaken by the cooperating teachers was related to issues and problems of the local communities as shown by community study and surveys and also to the needs and interests of young people as revealed by their questions and their perplexities.

In one large city, the director of science teaching encouraged teachers of biology, physics, senior science, and chemistry to undertake studies, called *departures,* outside the regular courses of study. This led to studies in the local community of nutrition, housing, interior lighting, safety, conditioning human behavior, internal-combustion engines, refrigeration, and many others.

Real Interests

In another large city it was found, through use of questionnaires, that there were strong interests in prevention of highway accidents, in conservation, and in consumer education. In another school system the interest was in helping students appreciate the wide range of variability and, at the same time, the vast degree of interdependence existing among all living things. In one of the smaller cities the teacher of biology centered his work through one semester on growth and development of the individual and through the second semester on the community. In an industrial city one study was of causes of illness and types of treatment used with particular attention to home remedies. In some of the schools there was active interest in cooperation carried on between teachers of different subjects. In one private school the cooperation was between a teacher of chemistry and a teacher of economics. In two other schools, both in large cities, several teachers with common interests worked together on local problems.

In each instance the teacher was undertaking something that for him was new. The newness was not only in the area proposed for study, but also in the method to be employed in teaching. In their dealings with innovations the workshop participants were at the same time learners and teachers, and in the methods actually employed, the boundary between these processes was by no means distinct. The common problems and interests in the several undertakings were centers for group study in the workshops. Specialists in the areas selected for study were frequently invited to lead the discussions of these groups and to recommend sources for further study.

Illustrations:

Areas of Study in the Workshops

Questions about race differences were prominent in the minds of many if not all participating teachers. An expert in physical anthropology was invited to guide the study in this area. The precision of his language in discussing the scientific studies of human differences was immediately helpful in clearing away confusions that were widespread. He was particularly helpful in pointing up ways to recognize what is true, what is questionable, and what is false in this area, which was then and is today so highly charged with emotion.

Questions about the meaning of science and the possible extent of its application in building a way of life were ever present. A professor of philosophy was invited to lead the discussion in this broad area. It was effectively brought down to specifics by questions that had been prepared before the discussion began.

Under leadership of a professor of economics attention centered on adequacy of resources for a high standard of living. A physiologist guided the study and discussion of the human factor in industry. An engineer gave leadership in study and discussion of science and technology. In the studies of agricultural production, the teachers were assisted at one time by a practical farmer who had recently participated in an important soil-conservation project and at another time by professors employed in a nearby agricultural experiment station, who were experts—one in soils, one in poultry, and one in dairying.

These are illustrations of the major areas of study undertaken in the workshops. Each of these areas, mentioned as illustrations, was of general interest to all, but the intensity of work in each area varied with the immediate needs of the participants. Immediate needs were determined by considering the relation of the particular areas of study to the interests and problems in the communities from which the teachers had come and to the plans for work which each one was developing for the ensuing year.

Powerful Motivation

In the workshop situation in which teachers of like interests were working together to advance their understanding of important issues and problems, the work was powerfully motivated and the long-time effects of such study were indeed far reaching. In his evaluation of the work one member of the group expressed an opinion that seemed to have been shared by all when he said, "After one has worked through an experience such as this [referring to studies in one of the areas just mentioned] he will never again teach as he did before."

Isn't this the science teacher's dream? It comes true for a lucky hundred of them each summer.

General Electric Science Fellowships *for* High School Teachers

By HAROLD N. ROWE
Nott Terrace High School, Schenectady, New York

INCREASING interest in the General Electric Science Fellowships for highschool science teachers is being manifested on the part of educators. The present article is an attempt to answer pertinent questions, from the viewpoint of a teacher who was granted one of these fellowships last summer. Its plan is to describe the courses and to state the purposes of the Company in offering, and of the teachers in accepting, the fellowships, and to present an evaluation of the educational outcomes as seen by one who took the course at Union College, Schenectady, New York, during the summer of 1947.

The GE Program

In 1945 the General Electric Company initiated the program known as the General Electric Science Fellowships for Teachers, applicable in the field of physics. These Fellowships—now including chemistry—are offered to fifty experienced highschool science teachers in ten northeastern states and cover a six week summer period of lectures, laboratory, and classwork at Union College under Union professors and General Electric scientists and engineers. These courses are designed exclusively for the Science Fellows and are supplemented with field trips to General Electric's varied research and manufacturing operations, such as the Research Laboratory, General Engineering and Consulting Laboratory, Flight Test Laboratory, Television Studio WRGB, and the Chemical Department at Pittsfield, Massachusetts. The Fellowships cover tuition, maintenance at the College for six weeks, and traveling expenses.

The program endeavors to enlarge the teachers' grasp of new developments rather than to have a direct application to their own teaching. In the informal college atmosphere a pleasant *esprit de corps* has grown up from the easy exchange of ideas and experiences. Several planned luncheons and dinners give the Fellows a chance to meet General Electric personnel not directly connected with the instruction. Illustrative of this was the farewell dinner given for the 1947 group at the Parrott House in historic Schoharie, New York, where Philip D. Reed, chairman of the General Electric Board of Directors, was the speaker.

A Similar Project

This last summer, for the first time, a similar program for fifty physics teachers was carried out at the Case Institute of Technology, Cleveland,

Ohio, in conjunction with the Company's Lamp Department. This program is also designed to acquaint teachers with recent scientific developments.

The courses taken at Union College in 1947 by both physics and chemistry groups included the following topics: early ideas about atoms; the Avogadro number; masses and sizes of atoms; the electron; the planetary atom; the periodic table of the elements; molecules and molecular structure; small molecules; polymerization and condensation; large molecules; the colloidal state; synthetic resins and high polymers; the proton-neutron theory of atomic nuclei; nuclear reactions; nuclear fission; and atomic power.

The courses also included inspection trips to the manufacturing plants of the General Electric Company at Schenectady and Pittsfield, and demonstrations of apparatus based on most recent developments in the Engineering and Research Laboratories. These demonstrations involved high-voltage X-ray tubes, the electron microscope, the betatron, and phenomena in high vacua, magnetism, spectroscopy, and ultra-short radio waves.

Chemistry Laboratory Course

The chemistry laboratory course included both lectures and individual experiments in such topics as: properties of gases, liquids, solids, solutions, vapor pressure, viscosity, surface tension; types and rates of chemical reactions, mechanism of reations, catalysts; hydrogen ion concentration, pH measurements, pH in industry; titration methods and curves; instrumental methods of analysis, use of special reagents, conductimetric methods, the colorimeter, electrophotometer, spectrophotometer, and spectrograph.

While the chemists were working on these topics, the physicists had lectures and individual experiments on the following: radioactivity and X-rays; the charge and mass of the electron; photoelectricity; electric circuits; thermionic emission; the cathode-ray oscillograph; electron tube rectifiers, amplifiers, and oscillators; generation, propagation, and interference of miscrowaves.

Physics and Modern Civilization

Featured in the 1947 program of study at Case Institute was a course in Science and Engineering in the Control of Environment in which the effect of lighting, air conditioning, communication, and acoustical treatment on human efficiency and comfort was presented to show how physics contributes to modern civilization. Other courses offered were: Basic Concepts of Physics, and Frontier Problems in Physics.

Among the facilities of the Rockefeller Physics Laboratory at Case, of special interest to Fellows last summer, were a thirty million-volt betatron, X-ray diffraction equipment, and an electron diffraction camera. In addition, lectures and demonstrations were given at Nela Park, sometimes referred to as General Electric's "University of Light" because of its research and training facilities in the field of illumination.

No less than thirty-two names of General Electric scientists, engineers, and administrators appear on the schedule sheets covering the six week's work at Union College. Their talks were well planned, frequently illustrated by demonstrations, slides, or movies, and invariably given with an

air of friendly cooperation and helpfulness.

The professors and instructors from the College also cooperated to help us in our efforts to bring our scientific education more nearly up to date. Special appreciation is due three administrators: Prof. Vladimir Rojanski, who directed the work for the College; Prof. C. B. Hurd, who headed up the work in chemistry; and Dr. Saul Dushman, who acted as director of the Company's part. Dr. Dushman told us that the General Electric Company has always taken an extremely active interest in, and felt a deep responsibility toward, helping education, not only in the field of higher education, but also in that of secondary education.

We were all given a new impression of the importance of mathematics in modern science, and realized anew that we must stress mathematics in the highschool course of any student who hopes to make science his career. The story of the increasingly accelerated pace of scientific achievement was brought home to us again and again. Many of us had not previously realized the tremendous contribution of American industry in the realm of "pure science" as well as in applied science. The enrichment of our scientific background enables us to discuss more adequately the questions which the more eager student is continually directing at us.

Although the writer has recited pertinent facts in the paragraphs above, he admits a failure to express the full measure of enthusiasm which prevailed, and the mutual fellowship and inspiration that all enjoyed.

BRYANT Teachers Bureau
711-713 WITHERSPOON BLDG. PHILADELPHIA 7, PA.
M. A. Bryant
Thos. B. R. Bryant
W. D. Greulich
PEnnypacker 5-1223
Member—N. A. T. A.
30th year of Placement Service
EARLY ENROLLMENT URGED — WRITE — PHONE — VISIT
We have excellent positions throughout the year, officially listed by
COLLEGES, SECONDARY AND ELEMENTARY SCHOOLS

NEWCOMB & GAUSS CO.
1 CITY HALL AVE., SALEM, MASS.
Book, Job and Commercial Printers

Are you planning an educational workshop? Here are the necessities.

A Workshop *is* Democracy *in* Action

By FRANK S. STAFFORD

Specialist for Health Education, Physical Education and Athletics, U. S. Office of Education, Washington, D. C.

AN educational workshop is a meeting or conference where responsible and experienced people come together to work with specialists and consultants on interests and problems with which they have been confronted in their work, and which they find difficult to solve alone. Working groups are organized around these interests or problems. When individuals with different backgrounds come together to study common problems, it is to be expected that differences in thinking may exist. However, as they work together these differences will insure that all angles will be explored. There will emerge concepts of practical value because each participant is expected to do something about presenting and evaluating the different ideas as they relate to the problems of the group.

Preparation for Workshop

Before a workshop can be successfully set up, it is necessary to consider several questions, which if not answered, may cause the workshop to partially, if not completely, fail. Chief among these questions are: (1) What is the purpose of the workshop? (2) Can the purposes best be pursued by workshop techniques? (3) Who is the logical person or agency to sponsor it? (4) How will it be financed—are there to be scholarships, fellowships, stipends, or reimbursement for expenses? (5) Who should initiate planning? (6) What are the most desirable characteristics of a good site? Is such a site available? Can facilities be provided for the group work—the housing and the feeding of the participants? What are desirable group work facilities? (7) How long can participants make effective progress by group procedures? (8) Will it be possible to give college credit for participation both on the graduate and undergraduate level? (9) Where may capable participants and consultants be found?

Purpose

Before a workshop is definitely planned, the needs to be served should be determined. The objective should be simply stated and those considering the workshop method should be thoroughly convinced that the application of group work techniques is the proper method to achieve the best possible solution to the problem or problems presented.

The real purpose of a workshop should be to find out, through democratic action, the truths about a problem or a few related problems. This will involve a *comprehensive* study of the problem. Every side of a problem

must be presented and considered, and after the participants have thoroughly analyzed the entire problem, then and only then should attempts be made to reach tentative conclusions or to develop solutions.

The Director

The selection of a director is very important. The person chosen should have had successful experience in workshop direction and planning. He should understand workshop methods and the techniques and elements of "group dynamics" that are involved when a group attacks its own problems. He must be able to work well with people and by example, must set the pattern for the democratic attack to be used by the group.

Consultants

The director and the individuals doing the planning should secure the best qualified specialists in the field of study to serve as consultants. These consultants should be persons who will be recognized as authorities, and the majority of them should have had workshop experience. They must realize that they are to work *with* the participants toward a solution and that they are not to *tell* or *lecture to* the group except as the group asks them to do so. The consultants should be sympathetic with all the different viewpoints and interests.

Financing

Workshops cost money. Transportation, food, and shelter are required. Is it to be financed out of a special fund or is college or university credit to be granted and regular tuition charged to take care of expenses? Many workshops with college or university connections provide course credit. Sometimes the problems are of enough interest or importance to draw an enrolment of sufficient size to make it self supporting, but generally fellowships, scholarships, stipends, or at least money for expenses is provided. Funds are often secured from several sources. If there are a number of sponsoring agencies or organizations participating, these groups may share in the expenses by supplying funds and consultant personnel.

Length of Workshop

Workshops vary in length. Some are in session for only a few days while others last from six to eight weeks. Some colleges and universities have specified that they shall continue for a given period for purposes of giving credit and they have in that way left the impression that all workshops should be that long. The length should be determined by the problem or problems to be solved and not by an arbitrary time limit which fails to take the purpose or objective into consideration.

The average length of time seems to be from ten days to two weeks. Such a period often seems more desirable than does a longer period. In a longer period, the resources of the group become exhausted and this necessitates additional study and research before progress can be made toward a solution of the problems. Unless such study is one of the specific purposes, the workshop techniques cease to be problem-solving techniques. It really reverts to the lecture and study methods employed in the average college course. It should be called a course rather than a workshop if this prevails.

It has been previously stated that

credit is sometimes given for participation. The rules and regulations for credit may govern the length of the workshop. The amount of credit should be determined by the time consumed by the participants in actual work situations. This is much more sensible than is the setting of an arbitrary period of time which may be merely to conform to regular course standards.

Selection of Staff

A staff is necessary since each group working on a problem will need and want consultant services. The persons selected should be specialists who have had wider experiences than the participants. The problems to be studied should be in the hands of the consultants before the workshop starts so that they can be prepared to bring the greatest contribution to the attention of the participants. If possible, a staff meeting should be held before the workshop convenes and at periodic intervals while the workshop is in session. Such meetings should be held to aid the staff and the director to most effectively meet the needs of the participants. If the consultants selected are properly chosen, coverage of all sides of controversial or many-sided problems will be assured. If an insufficient number is available, special planning and study by those attending may result in partial compensation.

Staff meetings can also aid in the administration of the workshop. When the consultants and the chairmen of the working groups are combined they are often considered as an advisory or "steering committee" by the director. They may meet periodically or on call to advise on both routine and special problems. Consultants selected should not be allowed to come late or leave early. They must start with a group and they should stay with that group as it works through to a solution. If they are needed by another section or group of the workshop to help on a special problem, they should be used, but as soon as they have made their contribution they should return to their original group.

Consultants who are allowed to float from group to group usually do not make their maximum contribution. Generally, they are a disrupting influence as the group resents their presence because they either force the group to repeat part of its thinking in order to bring them up to date, or they are so far behind the group in its thinking that they cannot make a significant contribution.

Selection of Participants

Some workshops are set up on an elective basis and anyone who desires may attend. In others, the participants are selected or elected to attend in order to work on a special problem or problems. If the workshop is held to solve a specific problem, it may be desirable that all groups and interests involved participate. When this is the case, a selection method may be set up to assure that all concerned will be invited to be represented.

If the participants can be determined in advance, either by having a pre-workshop registration or by having delegates or representatives named, definite advantages accrue which can aid the director to plan most effectively how to help the group solve its problems. If there is advance registration, the number of

working groups can be estimated. The number of consultants needed can be secured and housing and meal arrangements can be made.

Agenda

In setting up an agenda it is desirable to check upon the routines of the school or community. The planning should take advantage of local opportunities offered by events or special programs that are scheduled. Allowance of time should also be made to utilize opportunities for visiting local resources. Due to the nature of the drives involved in group work technique, some individuals have a tendency to work too hard. Specific recreational periods should be set aside and activities of a varied nature planned to meet the needs of the group. If the group is made up of middle-aged adults, activities should not be too strenuous.

The director should insist that all participants observe the scheduled time for meals, recreation, and any general sessions that may be planned. The remaining time for group work will be determined by the rate at which the group works. Special meetings should be arranged only with the consent of the majority of the group.

Registration

Provision should be made for registration. All announcements and instructions sent out should indicate the place and time of registration. The registration should provide the director with the name, home, and business address of the participant. At the time of registration, room assignments should be made if special housing is provided. Information concerning meals, mailing address, time of incoming mail, local bus or street schedules should also be given at this time. Opportunity should be given for enrolment for credit and payment of fees if the workshop is held on a college or university campus, and the final agenda and instructions should be distributed.

Opening Session

Usually a statement of welcome is presented by the host or sponsoring group or groups. This should be followed by introductions. In a workshop it is essential that all members become well acquainted as soon as possible. Lapel tags and a roster of participants help individuals to become acquainted.

The introductions should be followed by a review of the origin and purpose of the workshop and all special instructions should be repeated. Opportunity should be provided for presenting questions. There should be a thorough discussion of workshop methods at this sesion. The director should answer questions, and in general, set the stage for the group work to follow.

If there has been a pre-registration with an opportunity for the individuals to present problems in advance, mimeographed copies of these should be distributed. These problems should be discussed and opportunity given for the listing of additional problems. After all problems have been presented, a method of classifying these into groups for study should be considered. After thorough discussion, the group may elect a committee, which is sometimes called a "Program of Work Committee" to delimit, group, or classify the problems. This committee should complete its work

before the opening of the second session. Special care in planning is required because this is often a difficult and time-consuming task.

While the Program of Work Committee is at work, the remainder of the workshop group should be taken on a conducted tour of the immediate workshop community in order to acquaint them with the resources that can be utilized and to establish a feeling of familiarity. This tour should specifically include the facilities to be used, such as library, visual aids, rooms where groups will work, and recreational facilities. Familiarity will encourage use of these facilities.

Organization of Working Groups

The Program of Work Committee should be instructed to make its report at the second general session. After the report has been presented, opportunity should be given for group discussion and action. Changes may be made in the recommendations presented before final adoption by the group.

The acceptance of the report should determine the approximate size and number of working groups. The committee in charge of grouping the problems under major problem headings will have to keep in mind the number of participants and the most desirable size for working groups. Experience indicates that the best size for a work-group ranges from ten to fifteen persons with no group smaller than eight and none larger than eighteen. Groups of this size usually assure sufficient resources within the group to satisfactorily attack the problem. On the other hand, the group is small enough so that every one can be expected to contribute. Since the number of major problems finally determines the number of working groups, the next step is the formation of these groups.

Freedom of Choice

All individuals should be given the opportunity to choose the problem or problems on which they desire to work. In this way each person selects the group that he will work with during the entire workshop.

As soon as the groups are determined, the meeting or working rooms should be assigned. In making these assignments, the size of the group and the size of the meeting rooms should be considered.

Following the determination of the groups and the problem areas, the consultants should meet with the director to decide which group they are to serve. These consultants may be asked to act as the temporary chairman of their respective groups in order to start the group on its problem. Ultimately, after everyone has had an opportunity to get acquainted, the group should elect a permanent chairman and recorders. For obvious reasons, the consultant should never serve as the permanent chairman.

In some cases the chairman are selected in advance by the director or the staff so that they can be given group leadership training. This type of training is valuable and helpful but the advantages are more than offset by the disadvantages when the person selected is unsatisfactory to the group. It is better for the group to choose its own chairman on a democratic basis than it is to have an unwanted chairman imposed upon a group by an outside person or group.

Before a group makes its final

choice of a permanent chairman and recorders [usually on the third or fourth day] the duties and the characteristics of such persons should be discussed so that the group can make an intelligent choice.

There should be two recorders—one to keep a written record of the final decisions of the group, and one to serve as the blackboard recorder as the group tries to crystallize its thoughts and decisions in the process of problem study and solution. One necessary requirement for a recorder is that his handwriting be readable. It is also helpful if the recorder is skillful at grasping and phrasing the thoughts of others.

The Group Work Starts

As soon as each problem-solving group assembles, the temporary chairman should take charge and it is desirable that each person re-introduce himself, giving detailed information concerning his background, schooling, and experience. This is desirable as each person is, in effect, a resource for the whole group to use in the study of its problems. The more the group knows about one another, the more effectively they will draw upon these resources.

Following these detailed introductions, the group should examine its problem or problem area. The participants should discuss and, as a group, define its problem. It may be that the group will wish to restate the problem, especially after it has been thoroughly studied and discussed. They may also feel that the problem can be broken up into subproblems and that the best approach to a solution will be through the solving of these subproblems.

As the groups study their problems and as they progress toward solutions, there will be need for coordination in order to prevent unnecessary duplication and wasted effort. Usually during the course of the workshop, it is wise to have periodic *progress reports* presented to the whole body. Such reports will aid in coordination of work. Periodic meetings of the director, consultants, chairmen, and recorders are generally held to secure this needed coordination. Such meetings are also often called to study and agree upon methods of recording group thinking and progress. This is especially desirable if the workshop effort is to result in the publication of a bulletin, manual, or proceedings. These meetings will aid the chairmen and recorders to plan for such progress reports; present special problems of their group; study leadership techniques and problems of leading a group; share experiences; and exchange methods of handling group and individual problems.

Evaluation

Many workshops have been held on a great variety of problems during the past decade or two and in a great many instances no attempt has been made to evaluate the result. Just as it is desirable to stop and take stock periodically during the course of the workshop through progress reports and staff conferences, it is also desirable to have representatives of the group appraise the workshop and the progress made. The most effective evaluation is that which is planned for early enough to enable those responsible to collect data as the work pro-

gresses. Early in the workshop, an evaluation committee should be elected by the group. Sometimes such a committee is called a "Reviewing Committee." This committee should be representative of all the working groups and should study the organization, administration, and operation of the workshop. Such study should result in constructive criticism, commendations and recommendations.

If the workshop results in specific plans for action, then it may be desirable to have a follow-up or evaluation conference after sufficient time has elapsed to allow for the carrying out of the plans developed. Such conferences have been tried and found to be desirable by some groups.

Summary

In a workshop, success depends upon the contributions of both leaders and participants. Both must work together toward the attainment of a common goal.

The leaders must persistently guide the discussions toward the solution of the problem at hand. They must shape conditions so that friendly democratic relationships are established. Their chief function is to produce an emotional climate that will stimulate, encourage, and free the participants to make their fullest contributions. The leaders must show a sincere interest in what each person says. They must guide the discussion so that there is a complete interchange of opinion and thought.

A Joint Responsibility

The participants share the responsibility of the problem with the leaders. Success and failure is theirs as well as the leaders'. The participants and leaders are interdependent. The willingness of the more vocal members of the group to control their contributions and to help others to participate will create harmony. The group can make progress only as each individual voluntarily subjects his ideas to the critical thinking of others and to the test of scientific and known facts. An open-minded, objective attitude toward the expressed opinions and the experiences of others is essential.

Strong unity and coherence will develop among members of the group as progress is made and as each individual identifies his own purposes with those of the group. A feeling of "we-ness" develops among the members. When the leaders and participants honestly give their best, a feeling of satisfaction will come with the recognition that the final solution to the problem represents the combined efforts of all.

REFERENCES

Diederich, P. B., and Van Til, William. *The Workshop*—A Summary of Principles and Practices of the Workshop Movement. New York: Hinds, Hayden and Eldredge, Inc., 1945. 32 pp.

Heaton, K. L., Camp, W. G., and Diederich, P. B. *Professional Education for Experienced Teachers.* Chicago: The University of Chicago Press, 1940.

Otto, Henry J. and others (Barnard, Drenckhahn, Miller and Woods). *Community Workshop for Teachers in the Michigan Community Health Project.* Ann Arbor, Mich., University of Michigan Press, 1942.

U. S. Office of Education. *Responsibilities of Leaders and Participants.* Mimeographed. Washington, D. C., Federal Security Agency, 1946.

—— *Understanding Workshop Methods.* Mimeographed. Washington, D. C., Federal Security Agency, 1946.

Is freedom and informality a workshop ideal? Read how this one was run.

Missouri Shows How: *The* Springfield Workshop

By HERBERT S. ZIM

Consultant for Science, Ethical Culture Schools, New York, New York

WORKSHOPS, like politicians, may easily lose touch with reality. Like our Congressmen, they need an occasional return to "grass roots" to make sure they are meeting basic needs. As the educational prodigy of the past decade, workshops have become so popular that gatherings of teachers, seminars, field courses, curriculum committees, conferences or summer sessions are labelled "workshops." That's why the "grass roots" workshop at Springfield this past summer seemed so satisfying and so worth calling to the attention of teachers and administrators.

Perfect Location

Such a workshop was a natural for Springfield, Missouri, a typical trading center for a rich diary, poultry, and grain region. In this very normal American community of 65,000 persons, it is an added pleasure to see the consistent practice of sound democratic education. One phase of this was the workshop—organized by and for the teachers of Springfield. Three of these workshops had already been held. With each, techniques have been improved and the scope enlarged. So it was no surprise that the 1947 participants enthusiastically claimed this session as the best. That was, of course, a tentative judgment. The real answers are now being formulated as the teachers reconsider their experience in the light of their accomplishments during the present sessions of their schools.

Teachers' Wants

The Workshop Committee of the teachers' organization [The Community Teachers Association] planned this workshop. First, the Committee set out to discover just what the 300 Springfield teachers wanted. Their poll indicated interest in seven broad educational areas [not subjects]—of which science was only one. It further showed that teachers wanted direct help in working out their own teaching problems. They wanted a chance to exchange first-hand experiences as opposed to educational discussion.

With this mandate, Dr. William Van Til, now at the University of Illinois, set out to round up a staff of eight specialists. Meantime, in Springfield, the Committee enroled 90 teachers for the Workshop, scheduled from June 2 to July 3. The participants represented all instructional levels, from kindergarten through high school —classroom teachers, teachers of special subjects, and even school princi-

pals. Some came to meet the Springfield in-service training requirement, though this can be met in many flexible ways. Nearly half the participants, however, had already obtained their in-service credit, indicating that those who enroled were primarily seeking help to solve personal educational problems.

Planning Committee

Because of this desire to achieve specific personal ends, the projects got under way quickly and easily. By the second day all participants had met and conferred with staff members. Each selected a major and secondary working area. An over-all Planning Committee was elected, consisting of representatives from each workshop group and of the staff. Subsidiary committees tackled social affairs, luncheon programs, field trips, and other activities.

Sessions were held in the Springfield High School. Each day began with a meeting of the entire workshop: sometimes for brief announcements, sometimes for talks and committee reports. Participants then worked till noon in their major area. Everybody met again for lunch in the school cafeteria. Lunch was followed by a short recreation program. The afternoon was devoted to work in secondary areas, individual conferences with staff, study in the well-stocked curriculum library, or to special meetings. In short, the Workshop was a bona fide one, based on the needs of teachers, who participated democratically in running the Workshop and who took personal responsibility for progress in their individual or group problems. The members of the Workshop themselves worked in every phase of it—from inception to evaluation.

All this formed a fitting environment for problems of science teaching. Science activities permeated the Workshop. Nearly half the participants engaged in major or secondary work in science. Those who had not elected science work were not left out. They joined in field trips; explored the geologic and other natural resources of the region; viewed small, informal science exhibits set up in the curriculum library. On a series of visiting days, all participants left their own groups to spend time in others. There was ample opportunity for everyone to confer with the science staff. A teacher of crippled children came to talk about materials suitable for her handicapped pupils. Several domestic science teachers explored the relationship of their work to science. An informal luncheon conversation on African violets led to a full-blown meeting on modern methods of plant culture.

Three Subgroups

The particular nature of the teachers' science problems emerged on the first Workshop meeting. It quickly became evident that the science group was not a single group, but at least three subgroups. The first were highschool science teachers, scheduled to teach their subjects within a new general education framework in the autumn. These teachers had previously discussed the role of science in general education. Now they were ready for the very vital, practical problems of how to get going. The Workshop arranged for these teachers to meet daily with A. N. Zechiel, whose long experience in science education and curriculum planning with

the Eight Year Study made him just the right specialist to work with this group on what was essentially a pupil-teacher planning problem.

Another group of teachers from the McDaniel Elementary School had worked on science problems with staff members of the Horace Mann-Lincoln Institute. In their pilot school the group had developed a rich experiential background. Now they were ready to push on and explore methods and content areas, appropriate to the specific needs of Springfield. These needs centered on the fact that elementary science activities are developed in classroom situations and the class teacher must shoulder the responsibility of following through with little or no specialized help. This group tackled problems of motivation, equipment, organization of activities, and locating low-cost teaching materials for simple science.

Inadequate Science Background

The largest group, and the one most typical of American schools, was a group of elementary teachers, including a few from junior high school, concerned with their inadequate background in science. The curriculum in Springfield schools focuses on a number of broad community problems. It offers children an opportunity to ask questions and study problems in which science plays an essential part. These classroom teachers, troubled by their lack of equipment and experience to work with science, came to the Workshop for guidance. They were not beginners, but experienced teachers, conscious of the importance of science in the curriculum, yet a bit afraid to attempt something rather new and strange.

For this important group the workshop program had three aims: first, to give each participant the feeling that she could work successfully with science materials; second, to acquaint the teacher with simple sources of supplies and information; third, to examine each teacher's specific classroom problems, indicating the kind of science experiences that might serve best in that situation.

Individual Experimentation

The technique used with this group of teachers was to give them the freedom of a moderately equipped high-school science laboratory. Here, with staff help and a shelf of text and simple reference books, individuals and small groups tackled problems that seemed interesting and important to them. Some went to work on electricity, others on weather, sound, radio, rocks and minerals, soils, water, and the chemistry of iron. No formal committees were set up. Groups shared experiences and when something of special interest was going on, everyone gathered around to watch.

This type of experience was successful from the start, though it involved no formal demonstrations, no group instruction, no elaborate apparatus. My own function was to supply materials, to suggest references, to add a bit of advice on techniques, and to counter the persistent question, "Is this the way it should work?" by suggesting ways of seeing and measuring what was happening. Constant emphasis was placed on original ideas and variations from standard textbook "experiments." Soon one teacher brought in a water heater which had gone bad and worked out the cause —lime deposit clogging the pipes. Another came with a rural line phone which she dissected, studied, and re-

assembled. One tested the soil from her garden. Each experience gave rise to new questions. After the first success came a willingness to go farther, and the important feeling that the ways of finding out were often more important than the answers themselves.

We knew things were going well when one teacher brought her twelve-year-old son to the laboratory and built a crystal radio set with him. At this stage, a half-dozen fifth and sixth graders were added to the group, as a leaven. These pupils were not guinea pigs. They worked beside the teachers, sharing materials and ideas with them. It did not take the teachers long to see the same thrill of discovery in the pupils that they experienced themselves.

As the Workshop drew to a close, there were a few more formal sessions for bringing ideas together, surveying resources, and attempting personal evaluations of the workshop experiences.

Indication of Value

Notes from the teachers' own evaluation of themselves and their work give the best indication of the value of this type of workshop. These revealing records spotted needs, interests, and problems clearly. It is a pity that they cannot be quoted more fully than these brief excerpts.

One junior highschool teacher said: "I was new in the system. I was green and I was scared; scared particularly of science . . . . When I entered the Workshop, I suppose I expected a miracle to happen and to become an 'expert scientist' in four weeks . . . . Now I know it just isn't done that way, *but* I have gained enough confidence in myself to blunder along after the Workshop has closed. Science *is* fun!"

A teacher of first and second grades added: "I have also learned not to be too concerned if an experiment does not work out the way it was planned, but to try to understand why things happened as they did. Last but not least, I have found that anyone can learn about science if they are willing to experiment and read."

And one more comment, at greater length: ". . . I knew I was using books too much and didn't have enough meaningful activities in my classroom. Also I knew I was neglecting science. . . . Encouraging us to try things out for ourselves, suggesting further activities, gathering materials, tools, and books, bringing out points of importance from our activities are all methods I can carry back and actually use in the Fall. Experimenting with electricity myself has given me an understanding of the possibilities of arousing vital interests of pupils by that experimental method. From such activities other interesting studies may arise. . . . Now, if I can hold on to the spirit of this manner of teaching, my school days should be more meaningful and interesting."

The Answer

When classroom teachers of one, five, ten and even twenty years experience find something worthwhile in a science workshop, and are ready to share the same kind of experience they themselves enjoyed with their pupils, the "grass roots" needs of science education have been met. From this vigorous rooting, sound, healthy growth may be anticipated.

Schooltime *on the* Air

By A. L. LAUFE
Pittsburgh, Pennsylvania

SCHOOL children are gullible. They'll listen to amateur and local educational radio programs—good or bad—as long as their friends are on the air. They'll remember the sponsor—his name as well as his product—and out of loyalty to the station on which their classmates appear, they'll tune in to what they consider the less interesting school features as well as the popular recordings hour.

The program manager on the small station in the average third class city is usually aware of such an audience and schedules enough material of this type to hold interest without making the station a stamping ground for ambitious local amateurs with little or no talent. But in his attempt to please sponsors, the same program manager is likely to sluff the educational programs or handle them so carelessly that the full publicity of the idea is never reached. He neglects to take into consideration the two most important elements—the time of the broadcast and the willingness of the teacher in charge.

Of the two, the time element is predominate. For example, a new station in a growing community sought to gain favor and new listeners by giving one of the neighboring town's high school girls a program of her own. The young girl's voice was unusually good and her school authorities were more than willing to cooperate by giving the station publicity, free advertising in the school paper, and excusing the girl from afternoon classes to get to the station on time. The manager scheduled the program at 2:45 when all the children were still in school, thus eliminating the large drawing audience of friends and pupils her own age. The enthusiastic response hoped for was lacking, and when the program was cancelled by mutual agreement, neither party was very sorry that the association was brought to a close.

The same station then decided to schedule a series of Saturday morning broadcasts for the neighboring town's schools, but all arrangements were made with the local school boards and little or no effort was made to contact the principal and discover how willing the teachers might be to cooperate in such a situation. As was the case with most small schools, the dramatics teacher was overworked and had no time to prepare programs; a second instructor refused to miss two of his Saturday morning classes at a nearby University where he was working for a Master's degree; and the music director—unwillingly—was forced to round up his band and orchestra for two of the broadcasts.

It must not be assumed that teachers are surly and opposed to radio work! Far from it! In most cases, the idea of arranging a program is more of a novelty for them than it is for the students, but there are too many other issues involved. In the first place, every teacher will readily confess that

she hasn't the faintest idea of what to do or how to begin to prepare for the program. Secondly, those teachers who do have the ability to plan an interesting fifteen or twenty minute period are usually those members of the faculty who are already head over heels in work with extra-curricular activities. And in the third place, after a teacher has spent four nights a week rehearsing for a class play, and three afternoons a week preparing for the school paper, not to mention the time in between given to the one or two clubs she is asked to sponsor, the offer of appearing on the radio on her day off isn't too flattering or tempting.

Perhaps the best solution is the one tried by a station which arranged for a school broadcast during school time. But the program manager did not make the mistake of using just one soloist. He knew that type of program would be better at any time other than school hours. Instead, the station manager asked the school glee club to make a twenty minute broadcast and scheduled it in the early part of the afternoon during a school day. The school's superintendent was most cooperative and graciously brought the school radio and loud speaker out into the hall of the main building and turned the radio on full strength so that all classes could hear the broadcast. Portable radios were brought right into the classrooms wherever possible, and the youngsters as well as their parents were aware of the fact that school was being interrupted for a special broadcast. The fact that the music teacher and his class were excused from routine work for the afternoon served as an impetus to put on a better program and the clever handling of the whole situation plus the cooperation of both the school and the station did more to build up good will than a hundred single solo broadcasts.

School programs aren't sluff programs. They can't be handled haphazardly to fill in a fifteen minute lapse between recorded stories or commercial stories or commercial ads. They can't be used as substitutes to break the monotony of too many periods of dance records. And they can't be shoved on the air to fill time with the hope that someone might be listening in—as was the case with one station which scheduled the school program the same half hour the QUIZ KIDS were appearing on a rival station. Not only was the contrast too obvious in script preparation and performance but the fact was also neglected that most listeners would naturally turn to the QUIZ KIDS with the exception of friends and relatives of those participating in the local broadcast.

The solution isn't as difficult as it seems. The confidence of the teacher must be won. If she is willing to work, half the battle is won. If an attempt is made to arrange the broadcast at her convenience, she will be more than willing to go half way. It makes a great deal of difference whether she receives a notice from the superintendent saying, "You will have a radio broadcast next Wednesday. Please be ready as soon as possible." Or, if he contacts her with, "The radio station would like to have you put on a program. The radio people realize you have a busy schedule, too, and have asked me to make it possible for you to get in touch with them and arrange for the most suitable time for both of you." That isn't asking too

much. The clever program manager will still get the hour he wants if he is shrewd, and the teacher will have the satisfaction of being asked at her convenience. Furthermore, the manager will find her more than glad to cooperate if he will make some effort to suggest an idea, show her how to start writing dialogue, if necessary, and be willing to discuss a few of the details rather than heave a sigh of relief and say, "Well, that fills fifteen minutes more."

Then, with better cooperation on both sides, the run-of-the-mill school program will be replaced by a series of interesting broadcasts which will reflect the work of the school and will act as a magnet for other programs for the station instead of being just the usual time filler which the local manager feels he should have.

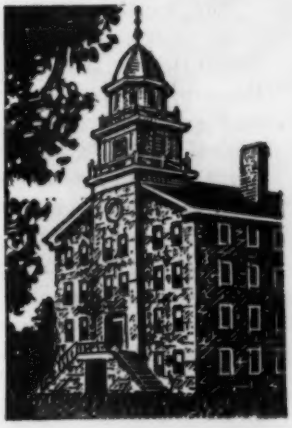
MIDDLEBURY COLLEGE SUMMER LANGUAGE SCHOOLS

FRENCH • GERMAN • ITALIAN
RUSSIAN • SPANISH

MIDDLEBURY, VERMONT
July 2—
August 19

Middlebury College's internationally famous Language Schools stress through training of modern language teachers. Efficient methods lead to mastery of spoken and written language, plus intimate knowledge of the foreign country's life, institutions, literature, history and culture.

Successful results are due in Middlebury's unique idea of complete segregation from English contacts; pledged exclusive use of foreign language in and out of classes; separate school residences, dining halls, native instructors. Offers Master's degree and Doctorate in Modern Languages.



For Illustrated Bulletin, Information write:

SUMMER SCHOOL OFFICE

MIDDLEBURY COLLEGE, MIDDLEBURY 5, VT.

EDITORIAL

"I ONLY WORK HERE"

By CARL G. MILLER

SOME progress is certainly being made toward giving teachers a voice in the administration of schools. The old "fascist" administration, in which the superintendent, or the principal, dictated almost everything is disappearing. At teachers' meetings, school problems are being discussed and teachers' committees are given opportunities to help formulate policies.

That things are not right yet in many places is indicated by a prevalent expression. "I only work here," says the teacher when he and some colleague recognize that they are facing a problem for which they lack instructions for solving or on which they disagree with school policy. For the use of this expression both the administrator and the teacher are subject to criticism.

The teacher's using it implies that he lacks interest in the management of his institution or that he feels his voice on the subject has never been given attention and never will be. Both attitudes are inexcusable. Against indifference the teacher must check himself. Perhaps he is becoming useless as a teacher. Against succumbing to a dictatorial administration the same person should refuse to be supine. It is true that he will have to be extremely diplomatic at times, but he should live in hope.

No small amount of criticism should go to the administrator if it is found that his teachers are given to saying frequently, "I only work here." Something is rotten in another place besides Denmark. Perhaps the administrator is a small dictator and needs reformation or replacement. Perhaps routine has become so deadly that everyone finds it easier to stall, or to dodge, when it comes to facing, discussing, and solving problems. Whatever the reason, every democratic administrator has a check to make. He should find the cause for the expression of hopelessness and eliminate it.

When it comes to administration, though, certainly there are two extremes to be avoided. One is the dictator plan in which the administrator decides everything. This, by the way, could be the most efficient of all if efficiency is all that is desired, and, it is interesting to note, could be extremely humanitarian if the administrator were a superhumanitarian. But such administrators exist for the most part in philosophers' pipe dreams and can't be found in sufficient numbers for practical installation.

The other extreme to be avoided is over-distribution of authority. Nearly everything is in the hands of committees, which are meeting so often that teachers lack time for instruction. "Too many meetings" is a righteous complaint from many teachers today. Let the administrator, then, make most routine decisions in the interest of efficiency. But when it comes to major problems in which the right answer is not clear and perhaps cannot be definitely found, then administrators and teachers must work out policies together after discussion and investigation. Even then a strong minority view must not be ignored.

FOR YOUR BOOKSHELF

Reviewed by William P. Sears, Jr.
New York University

Economics

A Survey of the American Economy, 1940-1946. By John R. Craf. New York. North River Press. 1947. xiii and 217 pages.

Professor Craf presents a succinct and factual account of the industrial mobilization and governmental administration of the United States for waging and winning the last war. The stories of national defense, conversion, priorities and allocations, rationing, the controls of raw materials, the food problem, war finance, wages, manpower, and reconversion are tersely told. Dr. Craf writes in an extremely interesting manner and zealously cites his sources. The book is one that can bring any course in economic and industrial history up-to-date.

Education

Fundamental Education: Common Ground for All Peoples. New York. Macmillan. 1947. 325 pages. $2.50.

How can the millions of illiterate people throughout the world be given a basic education? This is the question considered in *Fundamental Education*, a report of a special committee to the Preparatory Commission of United Nations, Educational, Scientific and Cultural Organization.

This important program, which would involve not only the mechanics of reading and writing but would also aim "at improving the life of a nation," lays the groundwork for one of Unesco's most challenging tasks.

In this volume, a searching analysis of the educational problems and issues of countries, which range in size from Honduras to China, are made by educational experts of many nations. Proposals for the solution of problems are made with a keen awareness that literacy and living standards are inextricably interwoven, and that any one phase of the problem—language, for example—is really a thousand problems. This is a challenging report, and deserves the consideration of all thinking individuals desirous of understanding the foundations essential for the growth of democracy among nations. —

—Irwin A. Eckhauser.

Supervision in Selected Secondary Schools. By Allen Calvin Harman. Philadelphia. University of Pennsylvania. xi and 181 pages. 1947.

"Supervision in Selected Secondary Schools" was submitted as a dissertation for the degree of Doctor of Philosophy at the University of Pennsylvania. Dr. Harmon has done a very creditable piece of work. The investigations were conducted in public secondary schools located in Delaware, Maryland, New Jersey, New York, and Pennsylvania. The book describes many outstanding supervisory practices and numerous quotations by teachers and principals are presented. This treatise is easily read and the data and conclusions should be of interest to supervisory leaders as well as teachers. — Robert L. Thompson, New York University.

New Techniques for Efficient Teaching. By Paul W. Nesbit. Published by Paul W. Nesbit, Estes Park, Colorado. 1947. 80 pages. Paper binding, $1.00, cloth binding, $1.75.

Mr. Nesbit presents a very ingenious method of teaching. A series of cards is prepared by the teacher. A question or teaching item is placed upon one side of a card, and the answer or result on the reverse side. By various methods described in detail, large numbers of these cards are circulated among the students. When a student has made a correct answer he earns the card and then makes it

available for another child to earn from him. It is a game-like method, automatic and self checking. Most youngsters would certainly welcome this occasional change from the hum drum of classroom labor. Teachers will find this book of interest and many will see fit to explore the further possibilities of this interesting teaching technique. — ROBERT L. THOMPSON, NEW YORK UNIVERSITY.

General Education in the Negro College. By Irving A. Derbigny. Stanford University Press. Stanford University, California. 1947. ix and 255 pages. $3.00.

Dr. Derbigny, administrative dean at Tuskegee Institute, has written an intensive and searching study of general education in American Negro colleges. Aims, curriculum patterns, guidance, and evaluation practices are studied and compared with similar items in other American colleges. The research involved the selecting of twenty representative Negro colleges out of the 118 Negro colleges in America. By interviewing instructors, observing class and guidance activities, and studying written materials, Dr. Derbigny gathered a comprehensive mass of data. Many problems were uncovered and Dean Derbigny's suggested solutions should result in numerous improvements in our Negro colleges.

Principles of Business Education. By Herbert A. Tonne. New York. The Gregg Publishing Company. 1947. VII and 568 pages. $3.00.

This is an important book, in fact one of the most important books in its field yet to appear. *Principles of Business Education* presents the basic principles, problems, and trends in the area of business education. The first part of the book, some fourteen chapters, deals with the place of business education in the secondary school. The balance of the book is concerned with the problems involved in training for various business occupations. Although major attention is given to the high school, full recognition is made to the increasing importance of the post high school business education. The volume is a comprehensive one and one that should challenge business educators. Dr. Tonne is to be commended upon his presentation—it is carefully done, accurate, and extremely well written.

Twentieth Century Education. Edited by P. F. Valentine. New York. Philosophic Library. 1947. 665 pages and index $7.50.

This is a comprehensive symposium giving an over-all view of the major issues and problems in contemporary education. A group of distinguished educators joined with the editor to provide a single-volume approach to the whole problem of modern education. The book is divided into five parts—Theory and Philosophy of American Education; Psychology in Education; Science and Education; Society and Education; Problems in General Education.

History

Ordeal of the Union. Volume I, Fruits of Manifest Destiny; Volume II, A House Dividing. By Allan Nevins. New York. Charles Scribner's Sons. 1947. $10.00 the set.

Ordeal of the Union is an authoritative and objective history of the years from 1848 to 1857. The span of history covered begins in the early spring of 1848 when exuberant American troops were streaming back from Mexico. Victory after victory had brought them to Mexico City and a triumphant peace. The war added some 850,000 square miles of territory to the Union. Northerners and Southerners marched side by side in the campaigns. With the victory, the national domain reached from the Atlantic to the Pacific. The new West became a veritable treasure house destined for endless exploitation. To the man of 1848, the United States seemed poised on the threshold of an era of peace, wealth and happiness.

Only thirteen years later, in 1861, the hope of tranquillity was dashed and the country was plunged into the bloodiest civil war of history. Professor Nevins in this informative history searches for the roots of the conflict and exhaustively analyzes the events of the thirteen-year span from 1848 to 1861. He tells not only what

went on in the political field but gives the social background against which the course of history must be assessed. There are new and striking portraits of the great figures of the day—of Webster, Douglas, Joshua Giddings, Horace Mann, Jefferson Davis, Abraham Lincoln.

The work can be read as a thrilling narrative but it is a study of tremendous scope and sound scholarship. It is the plan of Professor Nevins to present a third volume which will bring the story to 1861.

Literature

The Last of the Provincials: The American Novel, 1915-1925. By Maxwell Geismar. Boston. Houghton Mifflin Co. 1947. xii and 404 pages. $3.50.

This is a brilliant and searching book of criticism on the American novel in the decade from 1915 to 1925. The volume opens with vivid investigation and evaluation of H. L. Menken. It closes with a considered treatment of F. Scott Fitzgerald, the spokesman of the so-called Jazz Age. Between these two are significant interpretive criticisms of Sinclair Lewis, Willa Cather, and Sherwood Anderson. Dr. Geismar points out that these five figures present the main historical motif of the period—the final conquest of the American town and the values of an older rural life by the new economic order of the industrialized cities. A magnificent critical study which will be most valuable to teachers of American literature.

Oscar Wilde. By Edouard Roditi, Norfolk, Connecticut. New Directions. 1947. 256 pages. $2.00.

Critics of modern literature have strangely neglected Oscar Wilde. Two or three of his perennially popular plays hold their place in the commercial theatre and a bit of unsavory gossip still persists. In this critical and perceptive study, Mr. Roditi reveals how Wilde's ingenious, imaginative, and dialectical thought was of monumental importance in his time and is still a powerful influence in contemporary literature. Mr. Roditi's detailed analyses of Wilde's poetry, novels, plays, and critical writings will help many a present student of literature to a sane evaluation of Wilde's place in literature.

Elizabethan Studies and Other Essays. University of Colorado Studies. Series B. No. 4. Boulder, Colorado. October, 1945. x and 390 pages. $2.50.

This volume is dedicated to Professor George F. Reynolds, long a member of the Department of English and Speech at the University of Colorado and a scholar of international repute in his field. The volume came as a token of esteem at the time of Professor Reynolds' retirement as head of his department. The papers were contributed by his friends and his students. Although Professor Reynolds' particular field is that of the Elizabethan period, the papers in the volume cover a much wider span of letters. The volume is more than a memorial; it is a collection of very carefully prepared papers that will attract and help students in literature.

Mathematics

Elementary Concepts of Mathematics. By Burton W. Jones. New York. The Macmillan Company. 1947. xiii and 294 pages.

This book has been prepared to meet the needs of college students who have had a minimum of training in mathematics and who do not expect to take other courses in the field and yet who want a firmer grounding in what useful mathematics they have had and wish such additional training as they may find interesting and useful in life. Much space is given to an attempt to cultivate an *understanding* of mathematics. Certain mathematical concepts are clearly explained in an effort to straighten out the student's thinking on processes seldom thoroughly understood. There is also an attempt to cultivate an *appreciation* of mathematics, not an awe and fear of the field. Emphasis throughout the volume is placed on logical development. The book is written as a textbook and not a novel. The author holds to the belief that a pencil and paper and the working of problems are more necessary to an understanding of mathematics than is work in a laboratory to the understanding of the natural sciences.

These are the skills of the

ACTIVE CITIZEN:

- ★ How to Cooperate with Civic Authorities
- ★ How to Analyze Issues
- ★ How to Be Active in Community Betterment
- ★ How to Protet Your Rights as a Citizen
- ★ How to Be Active in Community Politics
- ★ How to Be a Worker in Your Political Party
- ★ How to Listen to Political Speeches
- ★ How to Read Political News
- ★ How to Study Platforms
- ★ How to Understand Constitutionality
- ★ How to Select a Candidate
- ★ How to Choose Your Political Party
- ★ How to Register and Vote
- ★ How to Write to Your Congressman
- ★ How to Vote Taxes
- ★ How to Serve on a Jury
- ★ How to Judge Good Local Government
- ★ How to Understand Social-Political Terminology
- ★ How to Be an International Citizen
- ★ How to Be a Responsible Citizen

They are unit titles of

WE, THE CITIZENS

Senior Problems in Civic Responsibilities

By JULIAN C. ALDRICH *and* MARLOW A. MARKERT

Use WE, THE CITIZENS, in the 11th or 12th grade to give students a *direct* understanding of their responsibilities, and *direct* experiences in civic participation.

WE, THE CITIZENS, the most notable advance in senior-high-school social-studies texts in a decade, has a more practical and specific approach to the problems of citizenship than you will find in any other text.

WE, THE CITIZENS, offers a *program of action* by which the understanding youth may become the active citizen. It emphasizes action with adults in the improvement of the local community.

Social-studies teachers who can't have classrooms sets of this new book ordered right away have one consolation—they can make good use of their personal copies in the meantime. Order your copy of WE, THE CITIZENS today, for 30-day free examination.

30-day approval—List price $2.75.
Single copies 20% discount;
4 to 29 copies, 30% discount;
30 or more copies, 40% discount.

INOR PUBLISHING CO. 207 Fourth Ave. New York 3